NOVEMBER 1, 1982

IRON AGE

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POLLUTION CONTROL:

Steel writes its ~~last~~ chapter.

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IRON AGE

NOVEMBER 1, 1982

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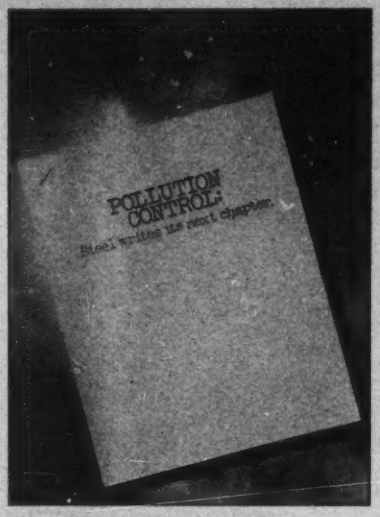

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STEEL WRITES THE FINAL CHAPTER ON POLLUTION CONTROL

By the end of 1984 the industry will have $10.8 billion worth of cleanup equipment installed and will capture 95 pct of emissions.

By George J. McManus

Steel companies may finally be nearing the end of the road in their long struggle to satisfy environmental requirements.

December 13, 1982, is the deadline for meeting air quality standards. Bethlehem Steel Corp. expects to be in compliance at all locations by that date.

Armco Inc. has successfully applied the bubble concept at its Middletown, Ohio, plant. Others are in the process of "bubbling" their remaining air and water emissions.

This would suggest the steel industry is in the last leg of its cleanup effort. Individual companies certainly seem to be in the homestretch.

"That's true with respect to the 1982 deadlines," says David Anderson, corporate director of environmental affairs for Bethlehem.

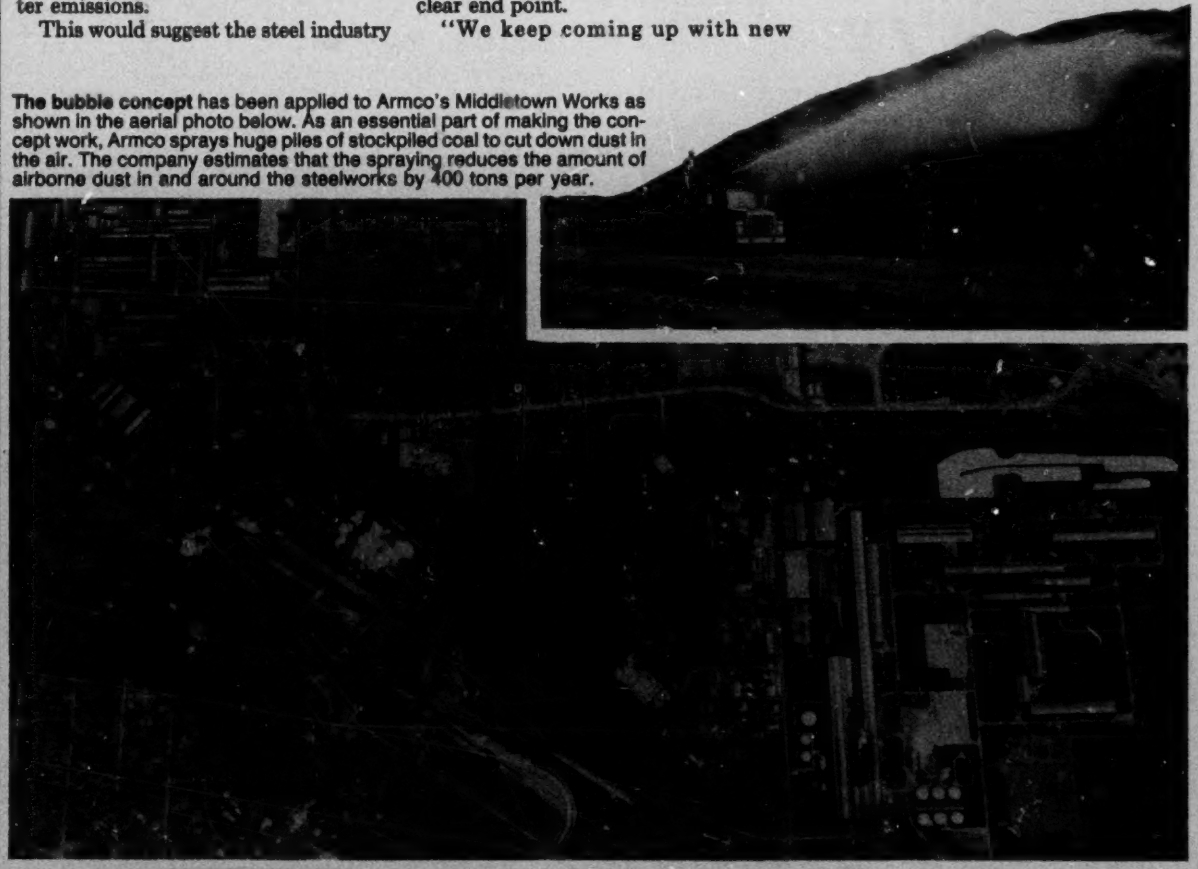
"Every year I ask myself that question," says John Barker, manager of environmental engineering for Armco.

Neither Mr. Barker nor Mr. Anderson are ready to give an unqualified answer. The environmental picture is too complicated and fluid for there to be a clear end point.

"We keep coming up with new things," says Donald Lang, director of air and water pollution control for Inland Steel Co. "I think we'll see increased emphasis on toxic substances."

In both air and water control, steel producers may see new sets of standards and deadlines. Existing health standards are now being reviewed by the Clean Air Scientific Advisory Committee. Steel producers hope the review brings an easing of requirements, but the effect could be just the opposite.

At some unspecified time in the future, the states are supposed to come up



The bubble concept has been applied to Armco's Middletown Works as shown in the aerial photo below. As an essential part of making the concept work, Armco sprays huge piles of stockpiled coal to cut down dust in the air. The company estimates that the spraying reduces the amount of airborne dust in and around the steelworks by 400 tons per year.

with secondary air standards, related to environmental aesthetics or welfare. These could be more stringent than the health standards now in effect. An Arthur D. Little study for the American Iron & Steel Institute (AISI) said it could cost another $7.7 billion for steel mills to meet all future requirements.

There is much uncertainty and considerable potential for large additional costs. Steel producers have reason to be wary. The environmental movement has lost some of its hysteria, but there is now a large network of government regulators and there is a hardened corps of environmental pressure groups.

Nevertheless, it is a fact that steel companies will have $10.8 billion worth of cleanup equipment installed by the end of 1984. Most of the pollutants—95 pct or more—are being captured. As Bethlehem's compliance suggests, steel companies are finding ways to meet air standards without muzzling the final expensive fraction of process dust.

In line with this, the regulatory trend seems toward more cost-effective means of dealing with pollution. Separating the worst fears of steel producers from the probable course of events, it may not be too wishful to suggest that steel environment costs have peaked out.

The immediate problem is that a rigid body of law is being administered by a vast bureaucracy. Faced with a static mass of legislation and regulation, companies are being told they must hurry to meet inflexible deadlines.

The difficulties in this regard are brought out by the deadline of July, 1984, for installing the best available water technology. That date was set on the assumption that the best technology would be identified in 1980. The effluent regulations for steel didn't come out until May of 1982. Steel producers argue there should be a corresponding delay in the compliance deadline.

"We wanted 42 months from the time they were imposed," says Earl Young, AISI vice president.

The Clean Water Act is up for re-authorization this year, and the Reagan Administration has submitted a package of amendments. Some steel producers hope a deadline change will be legislated. Mr. Young is not optimistic.

"I don't think there's any chance," he says.

A similar conflict exists on air cleanliness. Many states are still trying to come up with acceptable compliance plans. Despite the absence of these plans, the deadline for compliance remains at Dec. 31 of this year. Efforts to change the final date failed last year, and it's not expected there will be new legislation in 1982. (Cont. on p. MP-9)

ANNUAL CAPITAL REQUIREMENTS OF THE AMERICAN STEEL INDUSTRY

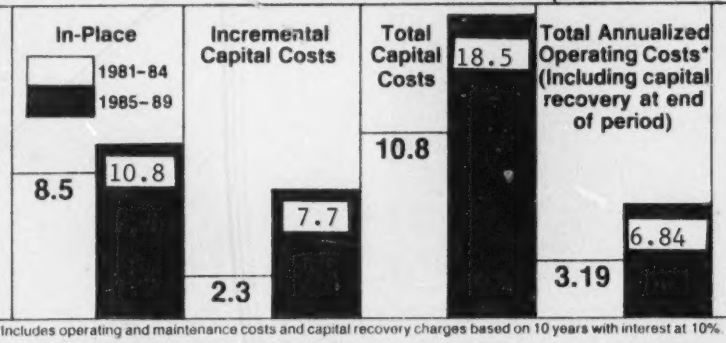
(Billions of 1980 Dollars)

Capital Expenditures	Current Requirements Through 1984	Projected Future Requirements Through 1989
Replacement and Modernization of Present Steel Capacity	5.5	6.1
Non-steel	0.9	0.9
Industrial Health	0.1	0.1
Environmental Control	0.6	1.5
Total Capital Expenditures	7.1	8.6
Other Capital Requirements		
Increases in Working Capital	0.1	0.1
Average Annual Capital Requirements	7.2	8.7
Capital Formation	4.3 (approx.)	5.6 (approx.)
Capital Shortfall*	2.9 (approx.)	3.1 (approx.)

*Including capital expenditures for environmental control. Source: Arthur D. Little, Inc.

Total Annualized Operating Costs

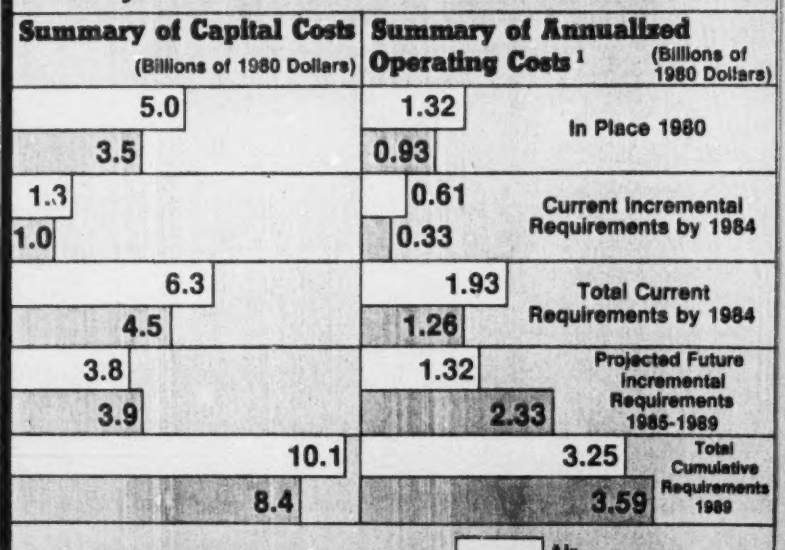
(Billions of Dollars)



*Includes operating and maintenance costs and capital recovery charges based on 10 years with interest at 10%.

By 1989, therefore, the U.S. steel industry, under the worst-case scenario authorized in these statutes, would have total capital costs of $18.5 billion and total annualized operating costs of $6.84 billion for environmental controls, the majority of which would be required to comply with meeting non-health related standards.

Projected Environmental Controls Costs



[1]Includes capital recovery charges
Arthur D. Little, Inc.

Big steel shares a shoreline with a national park

Since ground was broken in December 1962, Bethlehem Steel Corp. has spent nearly $1.7 billion in developing its Burns Harbor, Ind. plant. Of that sum, about $144 million—or $1 out of every $12—went toward modernizing its pollution control facilities.

The payoff is a plant that can now produce about 5.3 million tons of steel annually and, at the same time, share a boundary with a major national park—the Indiana Dunes National Lakeshore.

Its waste water treatment system is so effective, in fact, that clean water returning from the plant to Lake Michigan has no adverse effects on the stream through which the water passes.

Boating and fishing are now thriving sports, something the stream couldn't support before the water treatment system began operating.

Much of the water used at Burns Harbor is for cooling, some of which is recirculated in closed systems. As such, it doesn't contact pollutants.

Process contact water and discharges from wet air pollution control systems are treated in a tertiary or three-step cleaning process. First, dirty water is treated near its place of use—in the scale pits at the rolling mills, for example. Next, it's pumped to a central secondary treatment plant for further cleaning. Finally, the water flows through a 40-acre "polishing" lagoon.

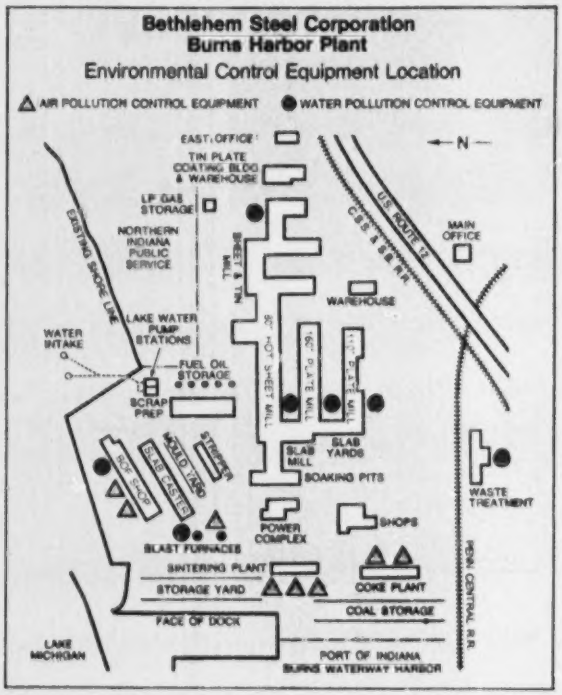
Only after the tertiary cleaning treatment is the water suitable for its journey down the Little Calumet River. But not all of it goes to the river. About 21 million gallons is pumped from the lagoon to various plant facilities. This recycling system started in 1978 and had a price tag of $6 million.

Just as much care goes into air pollution control. Conveyor belts between material storage areas and blast furnaces are enclosed to keep dust down. Blast furnace gases pass through high-energy scrubbers then used at other plant facilities.

Emissions from basic oxygen furnaces are captured in water-cooled hoods, then cleaned in scrubber systems. Fumes generated when hot metal is poured are also cleaned in a baghouse.

But the most difficult problem involved the coke ovens. Various systems were tried unsuccessfully. Finally, this problem, too, was solved, using two separate control systems. One is a "one spot car pushing" that traps emissions when coke is pushed from the ovens and cleans them in a high-energy Venturi scrubber system. The second is "stage charging," which reduces emissions when coal is charged into the ovens.

Pollutant materials captured in the air and water cleaning processes are recycled. Iron-bearing dust and mill scale are fed back into the blast furnaces. Gases from cokemaking and ironmaking are used at various plant locations as, for example, the plant's power station to generate steam and electricity.



By-products from cokemaking are sold to companies that make a host of products including synthetic fibers, perfume, paints, dyes and others.

Steelmaking is an inherently dirty process. But the Burns Harbor plant proves that large tonnage steel production and a clean environment can co-exist.

It may be that the Congressional stalemate is the lesser of two evils. "It began to look as though any changes would be bad," says Mr. Young.

That doesn't mean the current outlook is good. "Portions of the country are going to be operating without any clear guidelines," says Mr. Barker of Armco. "The country's illegal, I guess."

This could be a serious matter even for plants that have met requirements. The Environmental Protection Agency (EPA) is reportedly planning to ban heavy industrial construction in nonattainment areas after Dec. 31.

"Given the state of the steel industry," says Dr. Anderson, "that is not a serious problem. I wish it were." No one is likely to start building a greenfield steel plant in 1983. However, the steel market would be affected if EPA halted the construction of new power plants, oil refineries and the like. A cutoff of Federal funds for highway and bridge construction would also hurt.

The time factor comes into play in specific enforcement actions. It will probably take time for top level policy changes to be implemented. Under Anne Gorsuch as administrator, EPA has moved toward more reasonable policies. As a result of a change this year, the bubble concept can now be applied in non-attainment areas. The steel guidelines established in July allow the bubble to be used for water.

Some of the widely publicized concessions need to be put in perspective. When EPA released its guidelines for steel plant effluents, the agency said compliance would have about a third of the cost of compliance under regulations proposed during the Carter Administration.

"I think that's right," says Dr. Anderson, but he adds that the industry's estimate of costs under the original rules was double that of EPA. The reduction brings costs down to about where EPA said they would be in the first place.

The steel stretch-out provision passed by Congress in July has so many hookers that some steel companies are backing away from this.

Steel producers are cautious about proclaiming a new era, but they acknowledge there has been a high level shift at EPA toward greater flexibility. "There's been an attempt to make standards more reasonable and to apply them in a more reasonable way," says Dr. Anderson.

(Cont. on p. MP-11)

Steel's Environmental Experts and Some Opinions About Pollution Control

A look at steel environmental control throughout the world was provided in June of 1979 by a symposium of the International Iron and Steel Institute. The following are excerpted from selected papers:

Coke Ovens—P. X. Marciantonio, director, environmental control, United States Steel Corp.

"Examination source by source . . . would indicate that charging emissions can be effectively reduced by available technology as much as 95 pct or more.

"The control of pushing emissions with technology now being demonstrated suggest about 90 pct reduction or more with capture systems although some improvement in reliability still clearly is needed.

"Door emissions probably have been improved by about 95 pct or more using mechanical design and operating practices that have been developed.

"Topside emissions can be essentially eliminated from lids with diligent attention to sealing and cleaning practices. With regard to offtake piping, there may be need for design changes in certain components of the offtake piping but there has been about a 90 pct improvement in recent years by installation of operatiing practices and design changes.

Recycling Iron Wastes—Y. Yamada, technical cooperation department, engineering division, Sumitomo Metal Industries, Inc.

"During the first quarter of 1978, 49,281 tons of in-plant fines (dry base) were generated while approximately 1.2 million tons of crude steel were produced. (Disposal entailed careful handling and sometimes the forming of dust into concrete blocks at a cost of 8,000 yens a ton).

"The Sumitomo Dust Reduction plant (SDR) is now treating the fines not only generated in Wakayama Steel Works but also those in another steelworks . . . Carbon coming from the blast furnace acts as a reductant in the rotary kiln but the amount is not enough to reduce all the oxides and therefore some amount of coke fines is added into the slurry basins.

". . . the material is pelletized in the balling disc where some water is sprayed. Preheated pellets are then fed to a rotary kiln where iron oxide is reduced and undesirable elements such as zinc, lead, and alkalis are eliminated. The pellets over 5mm are fed to the blast furnace while those below 5mm are utilized in the sinter plant.

"The treatment cost cannot be covered by the value of recovered iron but compared with the other process which insure similar satisfactory treatment, this process may be the most beneficial one."

Sinter plant—Y. Watanabe, manager, technical section, Environmental Control Offices, Nippon Steel Corp.

". . . the sintering plant is the largest source of dust emission at a steel works. In the past, the cyclones installed at the time of plant construction had been used to clean the main exhausts at most sintering plants. Because of low dust collecting efficiency, however, the dust emission level by these cyclones was around 0.3 g/Nm. Although conventional electrostatic precipitators were in use at some plants, their performance was not satisfactory.

"In these circumstances, Nippon Steel developed a super-high voltage electrostatic precipitator called "electrostatic space clear super (ESCS)" to attain a high dust collecting efficency for sinter dust. At present, more than 10 ESCS's are in operation at its steel works. A variety of techniques have been developed based on the results of their excellent operation over five years."

Rolling mills—Water treatment—G. H. G. Layt, vice president operations, STELCO Inc.

"Development of chemical flocculating agents, use of air flotation, increased use of recirculating systems, more effective skimming systems, and the addition of mechanical filtration have all contributed to improved control of quality of process effluents. These developments involved significant research and capital expenditures and additional production costs.

". . . although reasonably effective methods are available for the removal of pollutants from water used in steel rolling mills, work is continuing to develop systems which can meet the increasingly stringent standards and be acceptable from the capital and operating cost point of view."

It isn't clear that the policy changes have yet filtered down through the ranks of EPA. The agency has about 9,000 full-time people and employs another 3,000 for consulting and other part-time functions. An organization of this size is not likely to change directions overnight.

"I don't see any significant change except a greater willingness to talk," said Mr. Barker.

"I think EPA is taking a more flexible view in some cases," says Donald Lang, director of air and water pollution control for Inland Steel Co.

"When it comes to individual facilities, they haven't relaxed their effort," adds Mr. Lang. "We've come in for increased surveillance."

Dr. Anderson feels it's too soon for a final judgement. "The proof of the pudding is going to be in the enforcement and negotiations," he says. "The preliminary indication is there will be no change at all."

The absence of change is indicated by the slow progress in having bubble plans approved. The basic idea was first put forward in December of 1979. The soundness of the principle has since been demonstrated by Armco's experience.

"It's done everything we expected and a little better," says Mr. Barker.

Yet, nearly three years after the doctrine was authorized, only one or two steel bubbles have been approved. Part of the delay was due to the early exclusion of non-attainment areas. Even with the policy change, however, it is difficult to implement bubble plans. State, regional, and Federal approval must be obtained. Under the 'expedited' procedure of EPA, the Federal step, alone, takes six months.

One reason the 1984 water deadline is considered so tight is that much of the time will be used up in getting clearance for cleanup projects. Companies must obtain National Pollution Discharge Elimination System permits. It will probably be 1983 before these can be secured.

It should be said that EPA is caught in the middle on all controversial issues. Any easing of regulation is certain to bring cries of outrage and legal challenges from the army of private environmental groups.

Use of the bubble in non-attainment areas was challenged in the courts by two environmental groups and by the Northeast Ohio Lung Assn. The ruling handed down simply said that new sources could not be exempted from specific emission requirements because they were included in bubbles.

Fortune magazine recently reported that there are now over 80 registered environmental lobbyists in Washington. Taken together, said *Fortune*, four large environmental groups employ some 50 lawyers. A cynic might say that a lot of people would be out of work if it ever became apparent

pollution problems had been licked.

Anne Gorsuch has taken a lot of heat from environmentalists for EPA budget cuts and policy changes. This is said to be one reason EPA plans to take a hard line on state compliance with the clean air deadline. The aim, supposedly, is to draw companies into the Washington battle.

Up and down the line, EPA administrators are sensitive to charges that they are soft on big business. When a company announces a cleanup project, the announcement is likely to come from EPA. When a concession is made by the agency, there probably won't be an announcement. Two large steel companies recently declined to discuss their environmental programs on the grounds that public disclosures would rock the boat.

Apart from politics and pressures, a certain amount of delay seems inherent in environmental technology. This makes it difficult to link cause and effect. Steel companies have long contended that they are getting blamed for pollution caused by roads, farm lands and other non-traditional sources.

"The background is accounting for half the standard," says Mr. Lang of Inland.

The 1982 recession seemed to present a golden opportunity for documenting this position. Steelmaking operations have fallen to about 40 pct of capacity. In the Pittsburgh area, United States Steel Corp. has been operating only one blast furnace.

If steel processes were causing a large portion of total pollution, you would expect the steel cutbacks to bring a significant drop in pollution. If there is little or no change in total pollution, it would show that steelmaking doesn't account for a large part of the total.

Unfortunately, no one seems to know what is happening to air quality right now. "The time frame is too short," says Mr. Barker. Things like weather conditions and wind changes make it impossible to identify quality trends in just a few days or weeks, he indicates.

When enough data has been collected, there is then a long delay while this is being interpreted. "We're just getting reports on what air quality was in 1981," says Dr. Anderson.

Some very minute technical details can have momentous consequences for steel companies and others. Ever since the Clean Air Act was passed in 1969, steel companies have argued that the particulate standard was unnecessarily tight. The Act calls for regular review of standards and after AISI brought suit, EPA said it would take another look.

A review is now being conducted by the Clean Air Scientific Advisory Committee. It's expected the new particulate standard will exclude coarse particles as health hazards. Steel producers seem to favor this change. It could shift some non-attainment areas into the attainment column.

However, the emphasis on fine particles could complicate the trade-offs in bubble plans. The full impact of the new standards won't be known until EPA decides on the precise number of particles that constitute a health hazard.

As it stands, the ceiling is 260 micrograms per cubic meter. In a typical situation, about half the dust is fine—under 10 microns. That means the present standard for fine particles is somewhere around 130 micrograms. The Advisory Committee has given a range that extends above and below that level.

Steel producers don't see any big changes in the technology of emission control.

"If the standard is adopted at the low end of the range, it may mean more controls within three years," says Dr. Anderson. "The betting is it will be less stringent."

The secondary air standard is still very much up in the air. The Advisory Committee has said it should be based on visibility. The Committee has suggested a particle level but has not made a firm recommendation.

"All indications are they will set primary and secondary standards at the same level," says Dr. Anderson.

The Act doesn't specify when secondary standards should take effect. Maryland, which has one of the few complete plans, has chosen a 1985 deadline. Some states are using the same deadline for both primary and secondary standards. Many states have ignored secondary standards.

Dr. Anderson sums up the situation this way: "There are additional requirements facing us with the timetable poorly defined and requirements poorly defined."

The requirement to equip new facilities won't be too burdensome for the simple reason that steel companies aren't building many new facilities. The depressed state of the industry helps explain why the stretch-out of steel deadlines has been of only limited value.

Under 1981 legislation, steel companies can delay compliance with air standards if certain conditions are met. The main provision is that the money saved from the pollution delay must be committed for modernization by July of 1983. Companies must certify under oath that the modernization projects would not have been launched without the pollution saving. There must also be a commitment to make money available for the full cleanup job by 1985.

With their operations in the red, steel companies don't feel they can make extended capital commitments of any kind. National Steel Corp., Inland Steel and others have withdrawn their applications for stretchout. Armco never applied.

In August, U. S. Steel received preliminary approval of a stretchout of air deadlines for its major mills. The approval was a "timely and helpful move," said David M. Roderick, chairman of U. S. Steel.

The timeliness of the action isn't fully established. "We must work expeditiously to modify the consent decrees to include extended compliance dates for our plants," said Mr. Roderick. He noted that this will mean negotiations with the Justice Dept., EPA, state and local officials.

Mr. Roderick praised EPA for an effort to "balance its clean air regulatory activity with the current national concern for boosting plant modernization."

If there is not a balancing of environmental needs with economic realities, the effect could be to accelerate the contraction of the steel industry. It's no secret steel producers are taking a hard look at all plants with a view to possible shutdowns. In marginal cases, says Mr. Barker, "the environmental cost will be the final straw."

It was not the straw that led Bethlehem to announce plans for selling its operations in Seattle and Los Angeles. Dr. Anderson is quick to say that both plants are in full compliance.

Steel producers don't see any big changes in the technology of emission control. The shed seems to be coming back into the picture for coke oven pushing emissions. New ways have been devised for controlling blast furnace cast house emissions.

The big change, however, is in the philosophy being applied. "We're seeing a much more intensive effort to look at cost and see if we can do the job more efficiently," says Mr. Barker.

The job will probably never reach the point where steel producers can sit back and say there is nothing more to do. Even when all the capital projects are completed, there will still be a need to maintain and operate facilities. □

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LIVING WITH SLOW GROWTH IN AMERICA

Economic growth will slow in the U.S. over the coming decade, say some top forecasters. Already, a number of major corporations are reshaping strategies to assure their own growth.

By John D. Baxter

The backwash of the current recession—and years of economic slowdown preceding the recession—carry some hard lessons for managers in manufacturing companies.

The lessons could lead to new ways of running companies and doing business for years to come.

That prospect is underscored by the increasing number of forecasters who see slowed economic growth, and moderated inflation, for the rest of the decade of the 1980s.

Some major U.S. manufacturers, with this view of the future, are already shifting their strategies to help assure their own continued rapid growth in the slow years coming up.

At this point in time, one of the harshest lessons comes from disinflation.

For one, disinflation means that the inflation-nurtured corporate strategy of free-wheeling product price increases to achieve profit goals is going by the boards.

As one executive puts it bluntly, "Price hikes can no longer be a cover-up for company inefficiencies."

Analysts at Moody's Investors Service say the prime implication of the new disinflationary environment is that "only the efficient producers will survive." The non-survivors, say the analysts, will be those manufacturers who ignore the disinflation reality in their product definition, markets and pricing strategies.

An insight, and a warning, on the new economic environment comes also from Edward S. Hyman, chief economist for the investment firm, Cyrus J. Lawrence, Inc. "Too many companies have planned on an 8 pct inflation rate and

it's more likely to be 4 pct. Only a very few companies are going to be able to cope with that and not lose their footing."

And long-term slower growth markets, with competitors thus more hungry and meaner, are leading to new corporate strategies to stake out market beachheads. In many cases, traditional market-share strategies are yielding to refined new-reality strategies that pinpoint and hold on to profitable market 'niches.'

In addition to these management approaches, there are strategy shifts to better compete on the basis of superior product quality, better service or technological leadership. In short, emphasis on more bang-for-the-buck strategies that allow companies to post prices that are still high enough in a slow-market, disinflationary setting to assure company profitability.

That profitability can't be assured any longer by a company's regular ratcheting up of its prices as was the easy-way strategy when inflation was the name of the game.

Too, the old imperatives of cutting costs and improving efficiency are being pushed to new heights of corporate commitment and action.

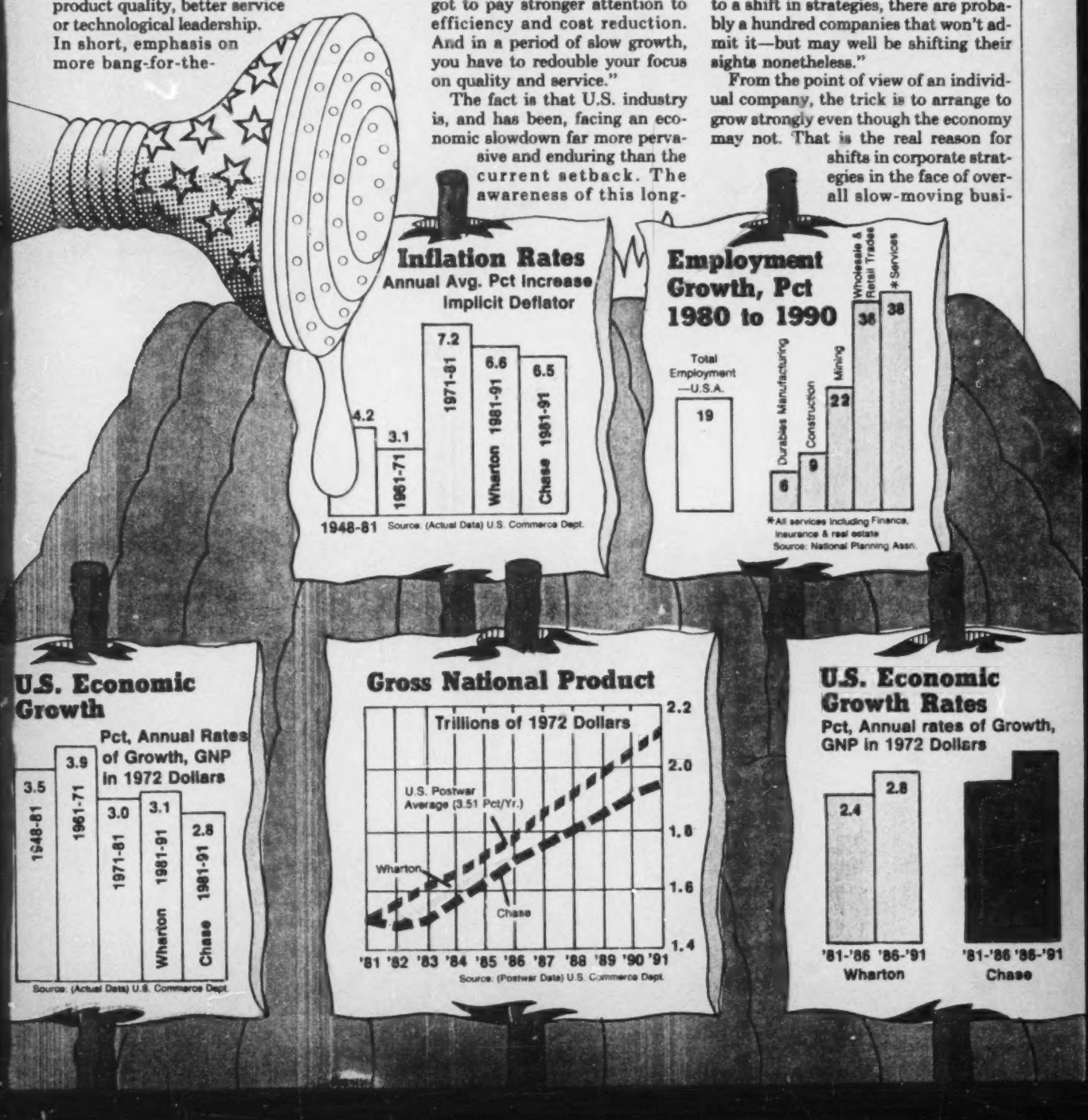
Edward Jefferson, DuPont Co. chairman, has said, "With a lower rate of expansion for existing products, you have got to pay stronger attention to efficiency and cost reduction. And in a period of slow growth, you have to redouble your focus on quality and service."

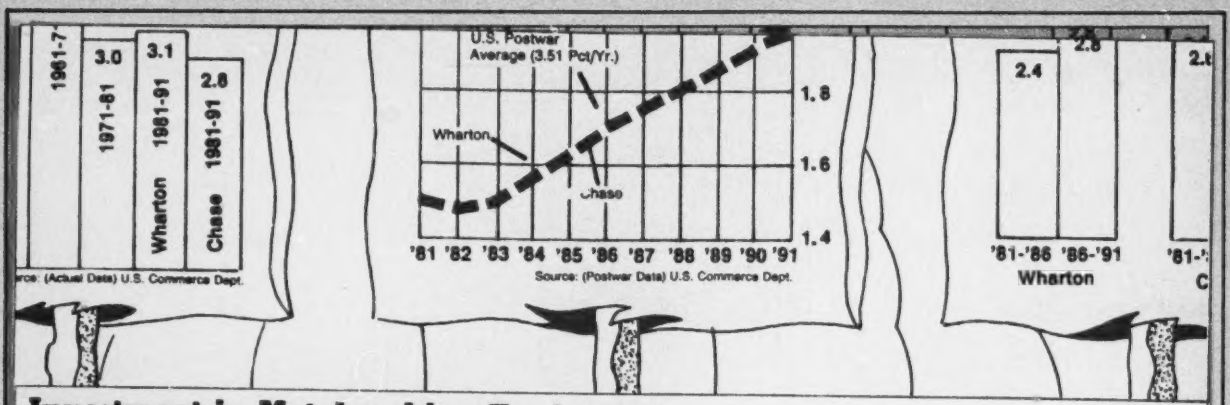
The fact is that U.S. industry is, and has been, facing an economic slowdown far more pervasive and enduring than the current setback. The awareness of this long-term-sub-par performance by the U.S. economy—with prospects for more of the same—is growing, and already starting to reshape corporate strategies. That list of companies includes some of the nation's largest and best managed ones such as General Electric Co. and Union Carbide Corp.

Some companies don't like to admit such things as coming business slowdowns. They take great pride in their current carefully honed strategies that management has hailed repeatedly in reports to stockholders.

One top corporate planning executive notes, "For every company that admits to a shift in strategies, there are probably a hundred companies that won't admit it—but may well be shifting their sights nonetheless."

From the point of view of an individual company, the trick is to arrange to grow strongly even though the economy may not. That is the real reason for shifts in corporate strategies in the face of overall slow-moving busi-





Investment in Metalworking Equipment

Selected Equipment, Billions of 1972 Dollars

	1977	1985			1990		
	Actual	Low	High I	High II	Low	High I	High II
Metalworking Machinery	$4.6	$5.3	$6.5	$6.5	$6.2	$9.0	$9.1
Construction, Mining & Oilfld. Mach.	4.6	6.1	7.4	7.4	7.9	11.4	11.5
Farm Machinery	5.6	6.9	8.2	8.3	8.3	11.8	11.8
Special Industry Machinery	3.6	4.4	5.4	5.4	4.6	6.7	6.8
General Industry	2.9	3.7	4.6	4.6	5.0	7.3	7.4
Material Handling Equipment	1.7	2.4	3.0	3.0	3.2	4.6	4.6
Fabricated Structural Products	1.6	2.0	2.4	2.4	2.6	3.8	3.8
Fabricated Metal Products (Ex: Struct.)	.7	.9	1.1	1.1	1.0	1.5	1.5
Engines, Turbines & Generators	1.3	1.9	2.3	2.3	2.1	3.0	3.0
Computers & Peripheral Equip.	8.1	10.7	13.2	13.2	17.0	24.3	24.4
Electrical Transmission Equip.	2.9	3.3	4.1	4.1	4.1	5.9	6.0
Motor Vehicles	22.4	23.3	28.5	28.6	26.1	37.9	38.1
Aircraft	1.6	2.7	3.4	3.4	3.3	4.8	4.8
Ships & Boat Building & Repair	1.2	1.5	1.8	1.8	1.9	2.8	2.8
Railroad Equipment	1.5	2.4	2.9	2.9	3.1	4.4	4.5
Totals for Listed Equipment	$64.3	$77.5	$94.8	$95.0	$96.4	$139.2	$140.1

Source: U.S. Labor Dept.

ness growth. It certainly is the reason at GE and Union Carbide. They have every intention of growing strongly in the projected weak-economy years they see ahead, and they are planning for that corporate growth. This 'growth' implies quality aspects as much, or more, than it does growth in sheer size.

Before a look-ahead is made, a quick look backward is called for to clearly frame the U.S. economic growth picture.

In the 1959-69 period, the U.S. economy grew at an average annual rate of 4.2 pct, as measured by real Gross National Product. In the 1969-79 period, it grew at a 3.2 pct rate.

And, of course, everybody knows of the even more sluggish rate of growth since 1979.

The companies hardest hit by this slowdown have been those in mature, hard-goods industries which includes just about all in metalworking. For example, inflation-adjusted new orders received by durable goods producers (87 pct in metalworking industries) this year are running 22 pct below the orders dollar volume of 1978. Even after excluding the especially sick auto industry, orders were down by about 11 pct.

The story in contracts and orders for plant and equipment is almost as bad. After allowing for inflation, this year will be the third straight one of decline. In 1982, these contracts and orders will come in below the 1979 level by about 20 pct.

But the underlying weakness in the capital goods sector, so important to metalworking, goes back much further in time.

Martin Feldstein, the new chairman of the President's Council of Economic Advisers, told members of Congress recently that U.S. investment in plant and equipment has been "pathetically low."

Mr. Feldstein testified that over the past two decades, "only 3 pct of GNP has been used to increase the real net stock of plant and equipment used by our nation's business, very much less than half the rate in other industrialized countries."

It is clear that when sub-par economic performance of the U.S. is discussed by economists, it encompasses more than the current recession. Depending on the measures involved, there has been an icy hand gripping the U.S. economy since 1974 or 1978. And, in at least one very important sector, as economist Feldstein notes, an underlying weakness has existed for years well beyond the 1973-75 recession.

And, if some leading forecasters are on target, there are more slow times to come.

There will be recovery from the current recession for sure, say the forecasters. But business expansion overall running through to 1991 will not be nearly as vigorous as anyone would like. And that 'not liking' importantly includes many whose job it is to plan growth for their own companies.

The chart (See p. 37) on real GNP, 1981-91, shows how the U.S. economy is projected to grow according to two leading forecast sources. Growth rates of 2.8 pct and 3.1 pct are forecast for the decade. This compares with a U.S. long-term rate of 3.5 pct. And, in another chart, inflation rates lower than in the 1970's are forecast.

The forecasts shown here are those

Long-Term Forecasters—Beware!

Below are reprinted two of George Forstot's favorite quotations. Mr. Forstot, associate director of corporate strategic planning for Union Carbide Corp., cheerily hands out these quotes—in huge type size—to visitors who come to hear his views on the outlook for the U.S. and world economy in the years ahead.

It is worth noting that Mr. Forstot's forecast record is an excellent one. This may be so because, as his fondness for the quotations shows, he is able to keep his head above the clouds but his feet still on the ground.

Caveat Forecaster

"Prediction of the future is—despite the pretenses of self-styled futurologists—impossible save as expression of intuition, guess and wish-generated or anxiety-inspired fantasy. No matter how inexorable any given trend may seem, the history of mankind teaches us to be respectful of the impacts of the prophet, the genius, the maniac and the random event."

Robert Nisbet, *Twilight of Authority*

"Those who look too far ahead are condemned to circle endlessly in a bottomless pit in hell, their heads turned backward on their shoulders, and their copious tears flowing down the cleft in their buttocks."

Dante, *The Divine Comedy*

developed by Wharton Econometric Forecasting Associates and by Chase Econometric Associates, Inc. They, of course, are not alone in projecting such long-term growth rates. Other sources show similar projections. And the U.S. Labor Dept.'s highly-regarded projections also show much the same picture.

Also, a number of corporate economists are telling their managements the same story. Executives at such leading companies as GE, Ogden Corp., DuPont and Union Carbide have all spoken out on slowed growth prospects. But, notably, each of the companies has vowed to continue their own solid corporate growth paths. They feel they now have, or have shifted to, the corporate strategies to help achieve that end.

GE economists are projecting U.S. real economic growth at an annual rate of 3.0 pct in the period they cover, 1983-92. And Union Carbide planners see 2.9 pct growth in the years 1981-91. These rates compare to 4.2 pct in the 1956-69 period and 3.2 pct in the 1969-79 period.

There is a leavening point about the widely forecast economic slowing that lies ahead. The early part of the decade will see the sharpest rate of slowdown as the U.S. economy slowly and painfully pulls itself up from the ashes of back-to-back recessions of 1980 and 1981-82.

The pattern of accelerating growth later is seen in the chart (see p. 37) that shows the economy growing faster in the 1986-91 period than in the 1981-86 period. Wharton EFA sees a 2.4 pct growth rate moving up to a 2.8 pct one after 1986. And Chase Econometrics sees a 2.6 pct growth rate turning into a 3.1 pct pace in the latter part of the decade.

One widely agreed-on assumption underlying prospects for slower economic growth is that the decelerating economies of other industrial nations will slow the U.S. economy. This country's economy is now seen as being in lock-step with those of most of the other industrialized nations. The economies of most of those nations have matured and slowed following their glittering post-war era of reindustrialization and rapid growth.

'Not all failures of judgment in business can be charged to living in the past.'

Union Carbide President Warren M. Anderson stresses what he calls "the emergence of global interdependence to a heretofore unimagined degree."

This 'interdependence' will serve as a drag on the U.S. economy because the projected growth rates of the other industrial nations are running, and will probably continue to run, at even lower rates than for this country.

George Forstot, associate director of strategic planning for Union Carbide, notes, "Our 10-year projections show a 2.5 to 3.0 pct real GNP growth for the industrial nations. That is down sharply from a 4.4 pct rate for the 1970s."

Walter Joelson, GE chief economist, has a favorite way of illustrating this 'global interdependence' in terms of U.S. involvement.

"I look at exports and imports and relate them to the goods portion of GNP," he says.

In adding U. S. imports and exports and comparing them with this goods sector GNP, he comes up with ratios of 13 pct in 1960, 18 pct in 1970 and a whopping 41 pct in 1980.

This interdependence has now reached the point where it can have a profound impact on the U.S. economy. Mr. Joelson notes, for example, that in 1981, from the first quarter to the fourth, the decline in exports accounted for 50 pct of the decline in the U.S. real GNP in the period.

The GE chief economist cites another widely-held assumption underlying forecasts of slower long-term U.S. growth; there will be lower growth in the labor force.

"In the 1970s," he says, "we had an enormous increase in the U.S. workforce. From 1969 to 1979, the average annual increase was 2.7 pct. That is absolutely unprecedented.

"For example," he adds, "between 1959 and 1969, we had a 1.7 pct rate of growth."

Mr. Joelson explains the the high labor force growth rate of the 1970s was due to the baby boom following World War II and the enormous increase in the number of working women joining the labor force.

He adds, "Neither of these phenomena will be with us in the 1980s. We estimate the labor force will increase between 1983 and 1992 at an average annual rate of 1.4 pct.

"So you can see that if everything else were equal, the mere fact that the labor force growth rate is cut in half, is bound to slow things down."

Perhaps the most commonly mentioned assumption underlying forecasts of slower economic growth is inflation—and the need of restrictive public economic policies to fight it. This is seen as still true despite recent almost dramatic cooling of inflation rates. It is widely felt that the real test in the fight against inflation will come as the economy shucks off the recession and business expansion resumes.

John F. Welch, GE chairman and CEO, has made it clear that he sees inflation as the center-stage villain in the economic slowdown scenario.

"The real world, as we see the decade of the '80s," he has said, "will be a time when inflation is clearly the number one enemy and most countries and most governments will fight that inflation with some form of tight money and fiscal responsibility medicine. The result—slower worldwide growth—slower

growth than in any of the past three decades will clearly be the planning base for the '80s."

It's not an idle exercise when corporations make the effort to get as clear as possible view of the future. It's an integrated part of the corporate planning process. It's the basis of near-at-hand management decisions.

Says Union Carbide's Mr. Anderson, "As managers, one of our most basic responsibilities is to anticipate the future."

He adds, "Not all failures of judgment in business can be charged to living in the past. But I think that virtually all important successes in business can be attributed to a willingness to live in the future."

Union Carbide offers a quick study in how one highly successful corporation plans to grow even as they envision a slowing overall economy in the years ahead.

Company planners, including Mr. Forstot, meet with a management committee to identify and analyze various issues and forces likely to shape the future.

"We planners," he says, "in a sense ask, 'What are you betting on?' "

From those sessions is selected a dominant theme, or force, in the given period to be projected. Around this theme are developed various scenarios relating to it.

Mr. Forstot notes that in mid-1981, company executives and planners identified 'International Tension' as the dominant issue. And, from it, they developed four base scenarios:

1. Fragile World Accommodation, 2. U.S. World Leadership—which assumes strong U.S. economic growth and this country leading the world out of the recession (not presently foreseen). 3. Major World Conflict—how would U.S. economy be impacted in case of U.S. non-involvement in a conflict, possibly between Russia and China, and 4. Ultranationalism—in such a case, countries would go to extremes to isolate themselves.

The number of base scenarios vary in each new planning process. There were six the previous time the company made projections.

"So," says Mr. Forstot, "we don't try to forecast 10 years out, per se. We analyze how a dominant issue or force—under various base scenarios—might shape the economy.

"Each year, however, is issued a projection for use as a baseline for planning. In that way, we all start from the same point. A manager can use other projections, but he must fully justify it."

As a result of Union Carbide planners seeing slower growth, the company has shifted from a long-held strategy of broad diversification.

"Seeing slower growth ahead," says Mr. Forstot, "and with some of our units in mature industries, we felt the best strategy we could take would be to focus and to stop expanding in all directions. The focus was on those things we do best."

In giving further insight into the company's strategy shift, the planner says Union Carbide is planning to continue to grow even in some relatively slow markets.

"You can still grow in a slow-growth market," he notes, "by getting a greater share of it, or in finding the right niche within that market that is showing relatively faster growth.

'In the end game, however, victory belongs to the people who manage cost.'

"It is part of our planning process to look for these niches, where we have an advantage in technology, or some other capability with which to attack."

A company doesn't have to be a huge one with a global reach to find such planning helpful, says Mr. Forstot. It's all a matter of scale, he says. A smaller company just starts with the question, 'What is the dominant issue, or force, that is likely to impact my customers and my markets?' The issue can be local or a regional one, it doesn't have to be broad in scope.

Says another top corporate planner, "In most cases, managers of smaller companies, by taking a good look ahead, would be quite surprised at what they would uncover.

"Changes that can profoundly impact on a company," he adds, "have a way of sending out signals ahead. Its just a matter of taking a careful long look and in using some of the basic planning approaches used by large corporations."

In the face of widespread forecasts of slower economic growth ahead, much is being heard of 'niches' and 'edges.' These refer to finding and holding on to profitable market niches in the face of slow overall market growth. And the 'edge' refers to developing and exploiting company competitive superiority such as through technology, quality or service.

Assuming every company, like fingerprints, is unique, Union Carbide President Warren Anderson says, "The direct goal of every company is not to increase market share and operating margins; it is to define its markets by becoming unique. From this uniqueness, market share and operating margins will follow."

The recurring stress by top managers and planners in finding and exploiting 'edges' and 'niches' as a way for companies to stay strong in a weak economy, is underscored by GE Chairman Welch.

"In this slower growth environment of the '80s, as companies . . . fight for that reduced volume," he says, "there will be no room for the mediocre supplier of products and services—the company in the middle of the pack.

"The winners in this slow-growth environment will be those who search out and participate in the real growth industries and insist on being number one or number two in every business they are in—the number one or number two leanest, low-cost, worldwide producers of quality goods and services or those who have a clear technological edge, a clear advantage in a market niche."

There seems to general agreement, also, that a slow-growth economy puts a premium on effective managers.

"In this new era," says Mr. Anderson, "managerial and technical skills will count for more than sheer size or vast capital resources, and human resources for more than natural resources."

Mr. Welch's predecessor at the helm of GE, Reginald Jones, has driven home another point on what kind of managers are needed. "If companies are to succeed in an era of slower growth," he says, "they have got to have people who are interested in something more than quarterly financial reports."

Still another top executive who sees the need for new management emphasis in a leaner economy is Ralph Ablon, chairman and CEO of Ogden Corp. He says, "We believe we are in a post-industrial society and mass-production has been replaced in importance by mass consumption.

"This means," he adds, "that our basic industrial complex has been built—although in dire need of renovation—and that the end game has replaced the growth game."

Mr. Ablon further notes that, "In a period of growth, management errors are not noticed and management efficiency is not essential.

"In the end game, however, victory belongs to the people who manage cost." □

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WHAT IT TAKES TO MAKE YOUR PLANT SAFE AND SOUND

The commitment to an injury-free plant floor begins with management's involvement with its in-house program.

By George A. Weimer

Safety begins at the top. Those companies with the best records in terms of plant safety invariably are run by managers who give safety a priority one rating.

If you don't have top management commitment to a safety program, you don't have much of a safety program.

Ford Motor Co. has had an excellent safety record for years. Says Dale Gray, corporate safety director, "One reason is a great interest on the part of top management in safety in terms of involvement as well as support.

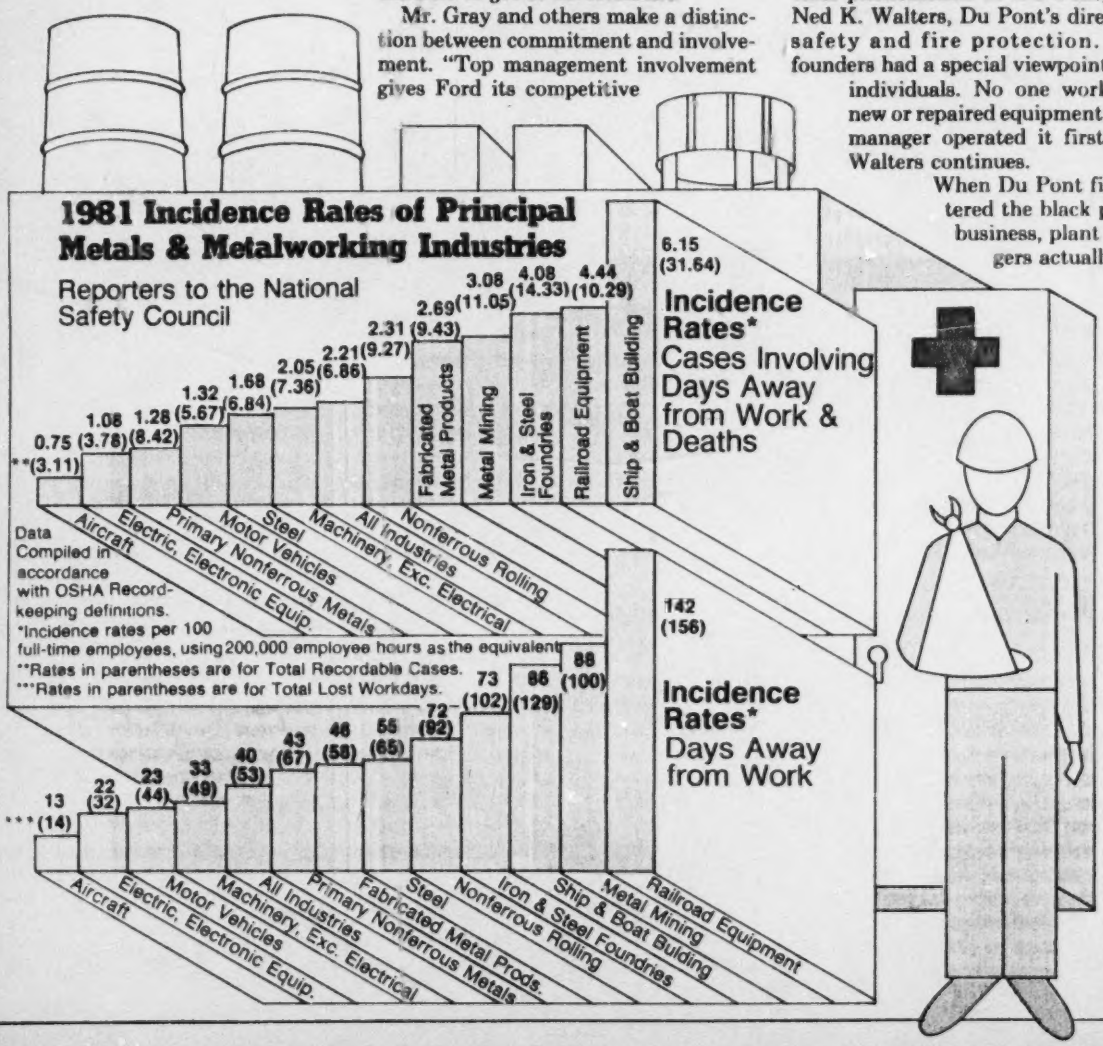
"Support," he adds, "is not nearly as difficult to get as involvement."

Mr. Gray and others make a distinction between commitment and involvement. "Top management involvement gives Ford its competitive edge in safety," Mr. Gray says. Further, he adds, "we spend money on our program."

Companies with exemplary records in safety are always companies with that same competitive edge of involvement.

Perhaps the leading company in the world of safety is Du Pont. "It's a cultural phenomenon at Du Pont," says Ned K. Walters, Du Pont's director of safety and fire protection. "The founders had a special viewpoint about individuals. No one worked on new or repaired equipment until a manager operated it first," Mr. Walters continues.

When Du Pont first entered the black powder business, plant managers actually lived



on site. "We firmly believe," adds Mr. Walters, "that a plant can operate with zero lost-time injuries."

Other companies with exemplary safety records include SPS Technologies, Republic Steel Corp., General Motors Corp., Parker Hannifin, and SCM's Glidden Coatings and Resins Div. Along with Ford and Du Pont, these leading companies in safety offer a composite model for safety programs that can approach Mr. Walters' ideal of zero lost-time accidents in industry.

How do they do it?

"It takes vigilance," says Dr. Robert G. Wiencek, General Motors Corp's general director occupational safety and health.

Besides "vigilance," it also requires auditing, monitoring and statistics. While it may seem odd to mix statistics with something as personal and potentially tragic as safety, the way these leading companies have approached the goal of zero is by statistical methods. P. F. O'Neal, Republic Steel Corp.'s corporate director of safety, industrial health and occupational medicine, notes that statistical monitoring of all injuries, no matter how minor, leads to the eventual elimination of more serious injuries.

F. Owen Kubias, manager-loss prevention, SCM Glidden Coatings & Resins says, "Many of us have a lot of Du Pont philosophy in us." All the leading companies refer to Du Pont so a detailed look at the Du Pont philosophy is appropriate.

"We ran our business for more than 150 years, working out progressively better safety systems along the way before we finally decided to sit down and analyze our experience to determine what the underlying principles were," Mr. Walters explains. "We used our experience to identify the principles. Since then, our marketing people in the Applied Technology Division have demonstrated that other companies who have adopted our principles and applied them rigorously can achieve significant improvements in their safety performance." Du Pont actually sells a safety package.

"The first principle is that all injuries and illnesses can be prevented," Mr. Walters adds.

The key word here is 'all'. "We believe that this is realistic goal and not just a theoretical objective, and our safety performance proves that the objective is achievable," he says.

Secondly, management, which includes all levels through the first-line supervisor, is responsible for preventing injuries and illnesses. Safety cannot be delegated to a staff group, a committee or a government agency.

The third principle is a corollary to the first principle: That all accidents are preventable. It holds that all operating exposures can be controlled. "In other words, where hazards cannot be eliminated, they must be managed," Mr. Walters says.

Safety is a condition of employment at Du Pont. "When you go to work for us, you must accept safety, the safety of yourself and of the people and facilities with which you work, as a consideration."

A fifth principle at Du Pont was established as a practical means for discharging that responsibility. It is: To train thoroughly all employees to perform their jobs safely.

A sixth safety principle is that "all deficiencies must be corrected immediately. Without prompt correction, deterioration will set in quickly and an increase in incidents will occur."

During this recession, . . . safety budgets have remained . . . high in terms of cost per individual employee.

Finally, "we recognize that it's good business to prevent injuries and illnesses."

Between 1976 and 1980, if Du Pont's safety record had been only as good as the chemical industry's as a whole, "our finance people tell us we'd have needed $625 million more in total sales to cover the additional expenses. If our record had been only as good as all of industry, we'd have needed an extra $1.75 billion."

More than 75 pct and, in some locations, more than 90 pct of the accidents that occur are caused by the actions of people, not faulty equipment. "That means that people must provide the solutions," Mr. Walters says.

Again, the statistical approach is the Du Pont approach. "Audit, audit, audit," says Mr. Walters. "As the seven safety principles state, feedback is a must if unsafe acts are to be avoided."

"If you're the safety director, you provide guidance to the site. The plant manager is the coach who makes certain that problems will be corrected, but the safety director must give management the advice, the game plan, if you will, it needs to accomplish the safety goals," Mr. Walters advises.

"If construction is behind time, or if a process isn't working properly, there is a human tendency to put safety aside until the problem is overcome. It is up to the safety director to keep safety goals in front of management all the time, to take a stand whenever it is needed."

Like Du Pont, Parker Hannifin's John Thompson, vice president, corporate industrial engineering, insists on regular safety meetings "top to bottom. It's a pretty high priority in our business. We've had no fatalities in 11 years. It's just good business not to have accidents."

"Keep safety in front of everybody," adds SCM's Mr. Kubias. "You need commitment and you need training. For new employees, don't wait. If you wait on safety training it doesn't seem important. Have regular safety meetings, certainly not less than monthly."

But, "a lot of companies think 'if you make an inspection, you've got a safety program.' The people part is more important; people thinking safety," Mr. Kubias says.

"The unsafe act," he warns, "is not always done by the injured.

"Safety," he adds, "can be managed, just like any other business responsibility."

Adds Republic's Mr. O'Neal, "When we design a new facility, safety is planned into it."

And, during this recession, all of these leading companies note that safety budgets have remained proportionately high in terms of costs per individual employee.

Republic's program, like Du Pont's, involves a great deal of management, union, and employee time. "We have two types of meetings. Once a week, every employee is contacted on safety personally. Our supervisors are required to talk to every employee on that regular basis. And, we have group safety managers meetings."

Just how high a priority safety is at Republic is seen in the one and only time an employee can refuse to do a job. If he says it's unsafe.

"A healthy, alert, intelligent, and well-motivated employee is the heart and soul of any good safety program and SPS's major emphasis in the prevention of accidents centers around people," says Rockwell M. Groves, SPS Technologies' vice president industrial relations.

"A good attitude toward safety is the cornerstone of SPS's safety record. Employees are able to contribute their ideas on safety through participation in a joint employee/management Safety Committee team.

"The employee committee members have been trained to regularly look for accident potentials, and to make recommendations for corrective action. Management also holds small group "Employee Communication Meetings"

which give employees the opportunity to discuss any aspect of their job—safety, quality or productivity, for example—with the plant manager.

Attempts are also made to solicit employee input into the design of machine guarding or sound covers. A heavy emphasis is placed on a neat, clean hazard free work area through monthly "Good Housekeeping" campaigns and awards.

"While our employees are the key to safety at SPS there is also behind the scenes work being completed on accident analysis, air and noise sampling, and safety training," Mr. Groves says.

"To provide a safe and healthy workplace for employees and to protect the value of our property and assets, it is necessary to have a strong safety program coupled with motivated employees who are concerned about their own well-being," Mr. Groves adds.

This means recognizing "potential threats to employees and property and taking steps to have employees help minimize them, keeping up with technological advances, and staying in compliance with hundreds of constantly changing state and Federal laws and regulations."

Also, all these leading companies suggest avoiding the gimmicks or at least minimizing such tools as contests, signs, slogans and so on. Safety is almost an unbelievably serious subject at the leading companies. "We've used all kinds of signs, reminders and so on, but they don't make or break a safety program," says Mr. O'Neal. He does suggest frequent changes in slogans if they are used. "We avoid contests and gimmicks in general," adds Parker Hannifin's Mr. Thompson.

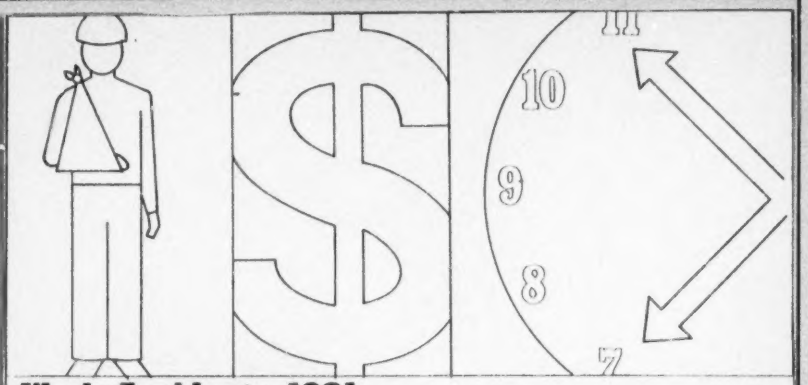
The only "contest" at Parker Hannifin is one in which an award comes directly from Patrick Parker, chairman, annually.

More important than signs in the plant, all the experts agree, is continuing education and constant monitoring. "Signs are reminders only," says Republic's Mr. O'Neal.

How do you measure a plant or a company's safety record. In two ways, says Mr. O'Neal. The incident rate and time lost." It's in the latter measure that the costs lie. But, it's in the former that much of the solution to the whole problem lies, leading safety experts agree. And, it's via statistical methods that the zero lost time goal is approached.

"Our objective is to reduce the frequency," says Mr. O'Neal. "If we reduce the frequency, we automatically reduce severity. We can show that statistically," he says.

All of these leaders in the safety area use computer techniques to manage



Work Accidents, 1981

Industry Group	Workers (000)	Deaths 1981	Deaths Change from 1980	Death Rates* 1981	Death Rates* 1971	Death Rates* Pct Change	Disabling Injuries 1981
All Industries	99,800	12,300**	−700	12	17	−29	2,100,000
Agriculture	3,400	1,900	−100	54	62	−13	200,000
Mining, quarrying	1,100	600	+100	55	83	−34	50,000
Construction	5,500	2,200	−300	40	58	−31	210,000
Manufacturing	20,200	1,400	−200	7	9	−22	400,000
Transportation and public utilities	5,400	1,700	+200	31	36	−14	200,000
Trade	22,500	1,200	−200	5	8	−38	360,000
Service	25,900	1,700	−100	7	12	−42	380,000
Government	15,800	1,600	−100	10	13	−23	300,000

Source: National Safety Council estimates. Numbers of workers are based on Bureau of Labor Statistics data and include persons aged 14 and over. * Deaths per 100,000 workers in each group.
** About 4,400 of the deaths and 200,000 of the injuries involved motor vehicles.

Time lost because of work injuries

	Days Lost
Total Time Lost in 1982	80,000,000
Due to Accidents in 1981	40,000,000

Includes primarily the actual time lost during the year from disabling injuries, except that it does not include time lost on the day of the injury or time required for further medical treatment or check-up following the injured person's return to work.

Fatalities are included at an average loss of 150 days per case, and permanent impairments are included at actual days lost plus an allowance for lost efficiency resulting from the impairment.

Not included is the time lost by persons with nondisabling injuries or other persons directly or indirectly involved in the accidents.

Due to Accidents in Prior Years	40,000,000

This is an indicator of the amount of productive time lost in 1981 due to permanently disabling injuries that occurred in prior years.

Time Loss in Future Years from 1981 Accidents	110,000,000

Includes time lost in future years due to on-the-job deaths and permanently disabling injuries that occurred in 1981.

Work accident costs

Compensation paid to all workers in the nation who are under workers' compensation laws was approximatey $13,359,000,000 in 1980 (latest figures reported by the Social Security Administration). Of this amount, $3,860,000,000 was for medical and hospital costs and $9,499,000,000 for wage compensation. These figures are not comparable to Council cost estimates due to differences in coverage of workers and types of cases.

Total Cost in 1981	$32,500,000,000
Visible Costs	$15,100,000,000

Includes wage losses of $5,100,000,000 insurance administrative costs amounting to about $6,600,000,000 and medical costs of $3,400,000,000.

Other Costs	$15,100,000,000

Includes the money value of time lost by workers other than those with disabling injuries, who are directly or indirectly involved in accidents. Also included would be the time required to investigate accidents, write up accident reports, etc.

Fire Losses	$2,300,000,000
Cost Per Worker	$330

This figure indicates the value of goods or services each worker must produce to offset the cost of work injuries. It is *not* the average cost of a work injury.

safety. "We enter into the computer all personal safety contacts. We're particularly interested in who's being missed. Every minor injury is recorded and investigated. If we can eliminate the minor injuries, we've also eliminated the major injuries and fatalities," says Mr. O'Neal.

Every morning at Republic, plant managers get reports from department supervisors. "The first thing discussed is plant safety throughout the corporation."

"The very old philosophy in industry," adds SCM's Mr. Kubias, "was accidents were part of getting something made. But for some time now we have seen it as a matter of management just like quality, production and profit."

All these experts agree that there are clear moral reasons for everyone to "think safety." But two other major corporate motivations for safety consciusness are legal and economic.

The economics of safety are clear in terms of workmen's compensation costs. Some interesting statistics on that and other cost-effective aspects of safety come up in a recent study from Lewis R. Kertesz in the Nebraska Safety Survey Research Project of the University of Nebraska, Lincoln, Neb.

Firms that have a separate budget for safety had 43 pct fewer accidents than those firms that do not have a separate safety budget, the study said.

Firms that used outsiding training organizations in safety training experienced 57.6 pct fewer accidents than those firms that do not use any outside help.

Those that conduct specific safety training for supervisors experienced 61.5 pct fewer accidents than those firms that do not conduct such training.

Companies which have an established system of safety inspections had 39.9 pct fewer accidents than those firms that do not conduct safety inspections.

And, those that have a written safety program had 106 pct fewer accidents than those that did not have their program in writing. If the firm wrote its own program, it experienced an accident rate 129 pct better than those that had no written program.

The most startling statistic of this study bears out what all leading company experts say over and over again.

Companies that had top management actively involved in promoting safety awareness had 469.8 pct fewer accidents than those firms that do not experience an active role in safety awareness.

The study also implied that the larger the company, the better its safety record. Part of that is a matter of available resources. Part also is a "it can't happen to me" syndrome in some smaller companies, says Mr. Kubias.

It is an irony that the Occupational Safety and Health Administration (OSHA) spent so much time and money on larger companies while much of the problem was and is with smaller companies. However, all the leading safety companies agree that OSHA was needed and has become more of a help over the years since 1971. They particularly applaud current OSHA Administrator Thorne G. Auchter's cooperative approach rather than the "police type" approaches of some of his predecessors.

Further trends in safety will include assisting workers in terms of safety off the job as well.

"When I came to OSHA, I established one major goal, reducing occupational injury and illness rates. We have sought to do that through a cooperative approach to workplace safety and health that uses a balanced mix of programs focused on the central goal of reducing occupational injury and disease. In our balanced mix, we have begun work on a number of safety and health standards, bolstered and clarified enforcement policies and improved our relationship with state programs," Mr. Auchter says.

"Most exciting and most promising, however, are our compliance assistance initiatives. These are efforts to intensify health and safety protection through voluntary workplace initiatives without an additional burden on OSHA resources.

"Wherever we can stimulate and encourage strong safety and health programs at the workplace, we should do so. Such programs capitalize on the expertise of employees and employers who are available in the workplace all day, every day to handle problems and to provide continuous monitoring of the worksite for potential hazards. In many cases, corrections can be made immediately.

"Thus, an effective program can make a far greater difference in the injury and illness record at a particular worksite than can a one-shot OSHA inspection," Mr. Auchter adds.

While some experimental programs are in effect, OSHA will continue to respond to worker complaints, and reports of imminent danger and catastrophes, but will not schedule programmed inspections.

As for the small company program, one "experimental approach we're testing would encourage employers, particularly small business in high hazard industries, to seek assistance through an on-site consultation program. Once the changes recommended by the consultant are completed, the employer will not be subject to a programmed inspection for one year," says Mr. Auchter.

And, safety management is not a static kind of discipline. It deals with technological changes just like any other kind of management.

One fast growing area of plant safety concern is toxic substances, notes GM's Dr. Wiencek. "We have a chemical substances listing system with a data base of 150,000 trade names used by our various plants in the U.S. and Canada. Before a material us used, it is checked through the computer.

"We have to know what's happening constantly in our plants," he adds.

GM and the UAW also agreed this year to establish an occupational health and safety board. The board is composed of six outside directors from the academic world and serves to advise GM on its health and safety program. "This is unique in industry," says Dr. Wiencek.

Further trends in safety will include assisting workers in terms of safety off the job as well, adds Republic's Mr. O'Neal.

And, the whole issue of robotics will need new concepts of safety, says Dr. Wiencek. "Robots must have safety engineered into the robot's envelope of activity."

Further advice on safety comes in terms of qualified people in safety engineering and industrial hygiene. Since the advent of OSHA, "more and more colleges offer training in these areas now," notes SCM's Mr. Kubias. "And safety equipment as well is becoming more sophisticated."

Finally, whether you are a leader in the safety area now or want to be, there is the issue of cost. Why is Ford a leader? "We spend money on our program," answers Mr. Gray.

And why is Du Pont so advanced? A key "raw material," says assistant manager, safety and fire protection, David J. Willette "is money. We've learned at Du Pont that money sunk into the 'safety process' is money well spent. Safety pays because it makes the entire operation of the company more effective." □

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EFFECTIVE OCTOBER 4, 1982

MATERIALS NEWSFRONT

Price & Production Data

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	163	157	123	235
Buffalo	29	31	27	58
Pittsburgh	123	130	125	376
Youngstown	60	61	62	124
Cleveland	96	100	106	158
Detroit	107	110	117	156
Chicago	361	3[illegible]	358	539
Cincinnati	54	[illegible]	76	93
St. Louis	57	51	38	83
Southern	72	74	74	245
Western	58	62	67	138
U.S. Production	1,180	1,209	1,173	2,205

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer.....gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/81.
**86.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Steel Production, Composite Prices

(Effective October 4, 1982)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1982	To Date 1981
Net tons, in thousands	1,180	1,209	58,507	95,323
Capability Utilization Rate	39.9	41.0	50.4	82.0
Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 4/4/82)	25.297	25.297	25.297	25.195
Pig Iron* * (Net ton = 2000 lbs.)	$213.00	$213.00	$213.00	$203.00
Scrap No. 1 hvy.* * * (Gross ton = 2240 lbs.)	$ 53.50	$ 55.50	$ 56.50	$ 91.17
No. 2 bundles	$ 39.50	$ 40.50	$ 41.83	$ 62.50
Scrap Comparison (Gross Ton)				
No. 1 steel, Pittsburgh ..	$ 55.50	$ 57.50	$ 57.50	$101.50
No. 1 steel, Philadelphia	58.50	59.50	59.50	78.50
No. 1 steel, Chicago.....	46.50	49.50	52.50	93.50
No. 1 bundles, Detroit...	47.50	47.50	51.50	93.50
Low Phos., Youngstown	58.50	63.50	63.50	103.50
No. 1 mach'y cast., Pgh	71.50	71.50	71.50	94.50
No. 1 mach'y cast., Phila	98.50	98.50	100.50	117.50
No. 1 mach'y cast., Chi.	103.50	103.50	105.50	127.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.
**Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.
***Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nonferrous Prices

(Effective October 4, 1982)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00	76.00-80.00	1/4/82
Copper (C)	65.00-67.00	64.00-67.00	10/1/82
Lead	24.50-29.00	25.00-29.00	9/24/82
Magnesium Ingot	134.00	125.00	6/1/81
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	41.00-42.00	42.00	10/4/82

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas .$2.00
Beryllium-aluminum 5% Be, per lb. contained Be.....$201.00
Beryllium-copper, per lb. cont. Be $121.00
Beryllium 97% powder 200.....$166.00
Bismuth, ton lots .....$1.35-$1.45
Cadmium, under one ton .....$1.05-$1.15
Calcium, ton lots, crown $3.05
Chromium, 99.8%.....$3.75
Cobalt, 99%, 250 kg.....$12.50
Gold per troy oz. $387.50
Indium, 99.9%, troy oz. $4.00
Iridium, dollars per troy oz.....$600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. ..$352-$375
Molybdenum, lb. tech. moly oxides, 20 lb. MO can.....$6.85-$8.50
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz.....$475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz.....$7.96
Vanadium $4.94
Zirconium sponge.....$12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Sept. 27—559.68
Sept. 28—Holiday
Sept. 29—559.48
Sept. 30—557.42
Oct. 1—557.19

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	65½	56¼
Yellow brass	57⅞	52¾
Red brass	61¼	54¾
Comm. bronze	62¼	55¼
Mang. bronze	57¾	56
Free cutting rod ends	44	43

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	53
No. 2 copper wire	46
Light copper	37

Ingot Makers Scrap

(Cents per lb. carload lots, del. refinery)

No. 1 copper wire	49
No. 2 copper wire	42
Light copper	33
No. 1 composition	50
No. 1 comp. turnings	48
Hvy. yellow brass solids	31
Hvy. yellow brass turnings	25
Radiators	40

Aluminum

New mixed clips	25	—26
Old sheet	24	—25
Old cast	24	—25
Clean dry borings	24	—25

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	23	—24
Mixed L.C. clips	21	—22
Old sheets and cast	15	—16
Borings and turnings	12	—13
Duraluminum clippings	22	—23

Copper and Brass

No. 1 copper wire	44	—45
No. 2 copper wire	37	—38
Light copper	33	—34
Radiators	32	—33
No. 1 composition	41	—42
No. 1 composition turn'gs	39	—40
Cocks and faucets	28	—29
Clean heavy yellow brass	24	—25
Brass Pipe	28	—29
New soft brass clippings	36	—37

Lead

Heavy soft lead	10	—11
Whole batteries	5	— 6
Type metal	15	—16
Electrotype	20	—21

Nickel

Nickel solids	115	—120
Nickel rod ends	115	—120
Nickel sheets, clips	115	—120
Nickel turnings	55	— 60

Zinc

New zinc clippings	14	—15
Old diecast zinc	7	— 8

EFFECTIVE OCTOBER 4, 1982

MATERIALS NEWSFRONT

(Effective October 4, 1982) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 55.00 to	$ 56.00
No. 2 hvy. melting	48.00 to	49.00
No. 1 dealer bundles	66.00 to	67.00
No. 1 factory bundles (auto)	60.00 to	61.00
No. 2 bundles	40.00 to	41.00
No. 1 busheling	69.00 to	70.00
Machine shop turn.	6.00 to	7.00
Shoveling turnings	20.00 to	21.00
Cast iron borings	18.00 to	19.00
Low phos. punchings plate	72.00 to	73.00
Heavy turnings	48.00 to	49.00
No. 1 RR hvy. melting	69.00 to	70.00
Rails 2 ft. and under	86.00 to	87.00
Scrap rails, random lgth.	82.00 to	83.00
RR specialties	73.00 to	74.00
No. 1 machinery cast	71.00 to	72.00
Cupola cast	64.00 to	65.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	540.00 to	550.00
18-8 turnings	440.00 to	450.00

Chicago

No. 1 hvy. melting	$ 46.00 to	$ 47.00
No. 2 hvy. melting	42.00 to	43.00
No. 1 dealer bundles	58.00 to	59.00
No. 1 factory bundles (auto)	60.00 to	61.00
No. 2 dealer bundles	38.00 to	39.00
Unburned bundles	34.00 to	35.00
No. 1 busheling	57.00 to	58.00
Shredder scrap	57.00 to	58.00
Machine shop turn.	14.00 to	15.00
Mixed bor. and turn.	15.00 to	16.00
Shoveling turnings	19.00 to	20.00
Cast iron borings	33.00 to	34.00
Low phos. forge crop	79.00 to	80.00
Low phos. punchings plate ¼ in. and heavier	83.00 to	84.00
Low phos. 2 ft. and under	78.00 to	79.00
No. 1 RR hvy. melting	50.00 to	51.00
Scrap rails, random lgth.	54.00 to	55.00
Reroller rails	85.00 to	86.00
Rails, 2 ft. and under	79.00 to	80.00
RR couplers and knuckles	72.00 to	73.00
RR car axles	102.00 to	103.00
No. 1 machinery cast	103.00 to	104.00
Cupola cast	89.00 to	90.00
Stove plate	76.00 to	77.00
Steel car wheels	63.00 to	64.00
Stainless		
18-8 bundles and solids	505.00 to	515.00
18-8 turnings	400.00 to	410.00
430 bundles and solids	120.00 to	130.00
430 turnings	75.00 to	80.00

Philadelphia

No. 1 hvy. melting	$ 57.00 to	$ 60.00
No. 2 hvy. melting	50.00 to	53.00
No. 1 dealer bundles	68.00 to	71.00
No. 2 dealer bundles	38.00 to	41.00
No. 1 busheling	68.00 to	71.00
Shredder scrap	71.00 to	74.00
Machine shop turn.	18.00 to	21.00
Mixed bor. and turn.	18.00 to	21.00
Shoveling turnings	27.00 to	30.00
Clean cast chemical borings	40.00 to	43.00
Low phos. 5 ft. and under	62.00 to	65.00
Low phos. 2 ft. punchings	89.00 to	92.00
Electric furnace bundles	75.00 to	78.00
RR specialties	74.00 to	77.00
Rails, 2 ft. and under	89.00 to	92.00
Cupola cast	53.00 to	56.00
Heavy breakable cast	55.00 to	58.00
No. 1 machinery cast	97.00 to	100.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 40.00 to	$ 41.00
No. 2 hvy. melting	38.00 to	39.00
No. 1 dealer bundles	47.00 to	48.00
No. 2 bundles	22.00 to	23.00
No. 1 busheling	46.00 to	47.00
Drop forge flashings	26.00 to	27.00
Machine shop turn.	21.00 to	22.00
Mixed borings and turn.	13.00 to	14.00
Shoveling turnings	21.00 to	22.00
Cast iron borings	17.00 to	18.00
Heavy breakable cast	29.00 to	30.00
Mixed cupola cast	45.00 to	46.00
Automobile cast	63.00 to	64.00
Stainless		
18-8 bundles and solids	415.00 to	425.00
18-8 turnings	305.00 to	315.00
430 bundles and solids	85.00 to	95.00

Youngstown

No. 1 hvy. melting	$ 52.00 to	$ 53.00
No. 2 hvy. melting	35.00 to	36.00
No. 1 dealer bundles	54.00 to	55.00
No. 2 dealer bundles	33.00 to	34.00
Machine shop turn.	4.00 to	5.00
Shoveling turnings	15.00 to	16.00
Low phos. plate	58.00 to	59.00
Electric furnace bundles	58.00 to	59.00
Galvanized bundles	49.00 to	50.00

Cleveland

No. 1 hvy. melting	$ 47.00 to	$ 48.00
No. 2 hvy. melting	30.00 to	31.00
No. 1 dealer bundles	56.00 to	57.00
No. 1 factory bundles	56.00 to	57.00
No. 2 bundles	29.00 to	30.00
No. 1 busheling	59.00 to	60.00
Machine shop turn.	3.00 to	4.00
Mixed bor. and turn.	3.00 to	4.00
Shoveling turnings	6.00 to	7.00
Cast iron borings	6.00 to	7.00
Cut structural & plates, 2 ft. and under	80.00 to	81.00
Low phos. punchings plate	80.00 to	81.00
Drop forge flashings	33.00 to	34.00
Foundry steel, 2 ft. & under	62.00 to	63.00
No. 1 RR hvy melting	73.00 to	74.00
Rails, 2 ft. and under	89.00 to	90.00
Rails, 18 in. and under	90.00 to	91.00
Steel axle turnings	76.00 to	77.00
Railroad cast	94.00 to	95.00
No. 1 machinery cast	99.00 to	100.00
Cupola cast	94.00 to	95.00
Stove plate	69.00 to	70.00
Stainless		
18-8 bundles	400.00 to	410.00
18-8 turnings	305.00 to	315.00
430 bundles	90.00 to	100.00

Buffalo

No. 1 hvy. melting	$ 29.00 to	$ 30.00
No. 2 hvy. melting	19.00 to	20.00
No. 1 busheling	36.00 to	37.00
No. 1 dealer bundles	34.00 to	35.00
No. 2 bundles	16.00 to	17.00
Machine shop turn.	1.00 to	2.00
Mixed bor. and turn.	10.00 to	11.00
Shoveling turnings	12.00 to	13.00
Cast iron borings	10.00 to	11.00
Low phos. plate	56.00 to	57.00
Structural and plate, 2 ft. and under	54.00 to	55.00
Rails, 2 ft. and under	46.00 to	47.00
Scrap rails, random lgth.	26.00 to	27.00
No. 1 machinery cast	69.00 to	70.00
No. 1 cupola cast	48.00 to	49.00

St. Louis

No. 1 hvy. melting	$ 50.00 to	$ 51.00
No. 2 hvy. melting	42.00 to	43.00
Foundry steel, 2 ft.	42.00 to	43.00
No. 1 dealer bundles	50.00 to	51.00
No. 2 bundles	39.00 to	40.00
Machine shop turn.	12.00 to	13.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	30.00 to	31.00
No. 1 RR hvy. melting	50.00 to	51.00
Rails, random length	52.00 to	53.00
Rails, 18 in. and under	67.00 to	68.00
RR specialties	80.00 to	81.00
Cupola cast	70.00 to	71.00
Heavy breakable cast	48.00 to	49.00
Stove plate	70.00 to	71.00
Cast iron car wheels	49.00 to	50.00
Rerolling rails	84.00 to	85.00
Unstripped motor blocks	55.00 to	56.00

Birmingham

No. 1 heavy melting	$ 56.00 to	$ 57.00
No. 2 heavy melting	53.00 to	54.00
No. 1 dealer bundles	56.00 to	57.00
No. 2 bundles	43.00 to	44.00
No. 1 busheling	56.00 to	57.00
Shredder scrap	75.00 to	76.00
Machine shop. turn.	20.00 to	21.00
Shoveling turnings	25.00 to	26.00
Cast iron borings	26.00 to	27.00
Electric furnace bundles	52.00 to	53.00
Elec. furnace, 3 ft. & under	54.00 to	55.00
Structural and plate, 2 ft.	75.00 to	76.00
Structural and plate, 4 ft.	67.00 to	68.00
No. 1 RR hvy. melting	54.00 to	55.00
Scrap rails, random lgth.	61.00 to	62.00
Rails, 18 in. and under	74.00 to	75.00
Angles and splice bars	65.00 to	66.00
No. 1 cupola cast	76.00 to	77.00
Unstripped motor blocks	55.00 to	56.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 32.00 to	$ 33.00
No. 2 hvy. melting	28.00 to	29.00
No. 1 dealer bundles	39.00 to	40.00
No. 2 bundles	28.00 to	29.00
Machine shop turn.	4.00 to	5.00
Shoveling turnings	7.00 to	8.00
Cast iron borings	8.00 to	9.00
Low phos. 18 in. and under	58.00 to	59.00
Rails, random length	47.00 to	48.00
Rails, 2 ft. and under	71.00 to	72.00
No. 1 cupola cast	52.00 to	53.00
Heavy breakable cast	22.00 to	23.00
Drop broken cast	68.00 to	69.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 30.00 to	$ 32.00
No. 2 hvy. melting	26.00 to	28.00
No. 2 dealer bundles	25.00 to	26.00
Mixed bor. and turn.	7.00 to	8.00
Machine shop turn.	9.00 to	10.00
Shoveling turnings	14.00 to	16.00
Clean cast. chem. borings	34.00 to	35.00
No. 1 machinery cast	94.00 to	95.00
Mixed yard cast	41.00 to	42.00
Heavy breakable cast	17.00 to	18.00
Stainless		
18-8 prepared solids	460.00 to	480.00
18-8 turnings	375.00 to	400.00
430 prepared solids	90.00 to	100.00
410 solids	80.00 to	90.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 33.00 to	$ 35.00
No. 2 hvy. melting	23.00 to	25.00
No. 1 dealer bundles	35.00 to	37.00
No. 2 bundles	20.00 to	22.00
No. 1 busheling	35.00 to	37.00
Shredder scrap	45.00 to	47.00
Machine shop turn.	1.00 to	2.00
Shoveling turnings	3.00 to	5.00
No. 1 machinery cast	105.00 to	110.00
Mixed cupola cast	28.00 to	30.00
Heavy breakable cast	4.00 to	6.00

San Francisco

No. 1 hvy. melting	$ 41.00 to	$ 43.00
No. 2 hvy. melting	33.00 to	35.00
No. 1 dealer bundles	28.00 to	30.00
No. 2 dealer bundles	13.00 to	15.00
Machine shop turn.	5.00 to	7.00
Cast iron borings	5.00 to	7.00
No. 1 cupola cast	85.00 to	87.00

Los Angeles

No. 1 hvy. melting	$ 40.00 to	$ 42.00
No. 2 hvy. melting	29.00 to	31.00
No. 1 dealer bundles	27.00 to	29.00
No. 2 dealer bundles	10.00 to	12.00
Machine shop turn.	5.00 to	7.00
Shoveling turnings	9.00 to	11.00
Cast iron borings	5.00 to	7.00
Elec. furnace, 1 ft. and under (foundry)	87.00 to	89.00
No. 1 cupola cast	89.00 to	91.00

Seattle

No. 1 hvy. melting	$ 56.00 to	$ 58.00
No. 2 hvy. melting	45.00 to	47.00
No. 2 bundles	35.00 to	37.00
No. 1 cupola cast	91.00 to	93.00
Mixed yard cast	81.00 to	83.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 53.00
No. 2 heavy melting cut 2 ft. and under	50.00
No. 1 dealer bundles	60.00
No. 2 bundles	18.00
Mixed steel scrap	32.00
Bush. new fact. prep'd.	58.00
Bush. new fact. unprp'd.	50.00
Machine shop turn.	28.00
Short steel turn.	31.00
Mixed bor. and turn.	20.00
Cast scrap	45.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 55.00 to	$ 56.00
No. 2 hvy. melting	43.00 to	44.00
No. 2 bundles	28.00 to	30.00
Machine shop turn.	8.00 to	9.00
Crushed turnings	22.00 to	24.00
Shredder scrap	55.00 to	56.00
Cut structural plate 2 ft. and under	77.00 to	78.00
Unstripped motor blocks	55.00 to	57.00
Cupola cast	64.00 to	66.00

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MATERIALS NEWSFRONT

Price & Production Data

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	159	163	159	251
Buffalo	29	29	28	59
Pittsburgh	134	123	140	358
Youngstown	72	60	59	128
Cleveland	99	96	106	169
Detroit	95	107	107	147
Chicago	341	361	338	524
Cincinnati	68	54	74	92
St. Louis	54	57	52	88
Southern	73	72	74	245
Western	59	58	58	143
U.S. Production	1,183	1,180	1,195	2,204

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)..... gross-ton 80.50-86.9*
Old range, non-bessemer ..... gross-ton $32.78
Mesabi, regular-unscreened ..... gross-ton $32.53
Mesabi, non-bessemer.....gross-ton $32.25-32.53**

*80.50¢—Pickands Mather as of 1/27/81.
**86.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

Steel Production, Composite Prices

(Effective October 11, 1982)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1982	To Date 1981
Net tons, in thousands	1,183	1,180	59,690	97,423
Capability Utilization Rate	40.0	39.9	50.2	81.7

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 4/4/82)	25.297	25.297	25.297	25.195
Pig Iron** (Net ton=2000 lbs.)	$213.00	$213.00	$213.00	$203.00
Scrap No. 1 hvy.*** (Gross ton=2240 lbs.)	$ 53.50	$ 53.50	$ 56.17	$ 88.17
No. 2 bundles	$ 39.50	$ 39.50	$ 40.50	$ 59.17
Scrap Comparison (Gross Ton)				
No. 1 steel, Pittsburgh ..	$ 55.50	$ 55.50	$ 57.50	$101.50
No. 1 steel, Philadelphia	58.50	58.50	59.50	78.50
No. 1 steel, Chicago.....	46.50	46.50	51.50	84.50
No. 1 bundles, Detroit...	47.50	47.50	51.50	83.50
Low Phos., Youngstown	58.50	58.50	63.50	95.50
No. 1 mach'y cast., Pgh	66.50	71.50	71.50	94.50
No. 1 mach'y cast., Phila	98.50	98.50	100.50	117.50
No. 1 mach'y cast., Chi.	103.50	103.50	105.50	124.50

*Finished Steel Composite
Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.
**Pig Iron Composite
Based on average prices for basic and foundry pig iron at representative producing points within the U.S.
***Steel Scrap Composite
Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nonferrous Prices

(Effective October 11, 1982)
Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	76.00	76.00-80.00	1/4/82
Copper (C)	66.00-67.00	64.50-67.00	10/8/82
Lead	23.00-29.00	24.00-29.00	10/5/82
Magnesium Ingot	134.00	125.00	6/1/81
Nickel	329.00	350.00	11/25/81
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	40.00-42.00	41.00-42.00	10/5/82

ALUMINUM: 99.5%. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: electro., Port Colborne, Canada. ZINC: high grade.

Antimony, American Laredo, Texas . $2.00
Beryllium-aluminum 5% Be, per lb. contained Be $201.00
Beryllium-copper, per lb. cont. Be $121.00
Beryllium 97% powder 200 ..... $166.00
Bismuth, ton lots ..... $1.35-$1.45
Cadmium, under one ton ..... $1.05-$1.15
Calcium, ton lots, crown $3.05
Chromium, 99.8% $3.75
Cobalt, 99%, cathode $12.50
Gold per troy oz. $433.00
Indium, 99.9%, troy oz. ..... $2.85-$4.00
Iridium, dollars per troy oz. $600
Magnesium sticks, 10,000 lbs. $1.91
Mercury, per 76-lb. f.o.b. N.Y. .. $370-$380
Molybdenum, lb. tech. moly oxides, 20 lb. MO can ..... $6.85-$8.50
Nickel oxide sinter at U.S. points of entry $3.12
Palladium, per troy oz. $140
Platinum, per troy oz. $475
Rhodium, per troy oz. $600.00
Silver ingots, per troy oz. $8.975
Vanadium $4.94
Zirconium sponge..... $12.00-$17.00
(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Oct. 4—556.26 Oct. 7—556.26
Oct. 5—556.26 Oct. 8—556.26
Oct. 6—556.26

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper	64⅛	53¼
Yellow brass	55¾	50⅝
Red brass	58¾	52¼
Comm. bronze	59½	52½
Mang. bronze	56	54¼
Free cutting rod ends	44	43

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	53
No. 2 copper wire	46
Light copper	37

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	49
No. 2 copper wire	42
Light copper	33
No. 1 composition	50
No. 1 comp. turnings	48
Hvy. yellow brass solids	31
Hvy. yellow brass turnings	25
Radiators	40

Aluminum

New mixed clips	25	—26
Old sheet	24	—25
Old cast	24	—25
Clean dry borings	24	—25

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	23	—24
Mixed L.C. clips	21	—22
Old sheets and cast	15	—16
Borings and turnings	12	—13
Duraluminum clippings	22	—23

Copper and Brass

No. 1 copper wire	44	—45
No. 2 copper wire	37	—38
Light copper	32	—33
Radiators	32	—33
No. 1 composition	41	—42
No. 1 composition turn'gs	39	—40
Cocks and faucets	28	—29
Clean heavy yellow brass	24	—25
Brass Pipe	28	—29
New soft brass clippings	36	—37

Lead

Heavy soft lead	10	—11
Whole batteries	5	— 6
Type metal	15	—16
Electrotype	20	—21

Nickel

Nickel solids	115	—120
Nickel rod ends	115	—120
Nickel sheets, clips	115	—120
Nickel turnings	55	— 60

Zinc

New zinc clippings	14	—15
Old diecast zinc	7	— 8

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MATERIALS NEWSFRONT

(Effective October 11, 1982) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of *Iron Age* editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 55.00 to $ 56.00
No. 2 hvy. melting	48.00 to 49.00
No. 1 dealer bundles	66.00 to 67.00
No. 1 factory bundles (auto)	60.00 to 61.00
No. 2 bundles	40.00 to 41.00
No. 1 busheling	69.00 to 70.00
Machine shop turn.	6.00 to 7.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	18.00 to 19.00
Low phos. punchings plate	72.00 to 73.00
Heavy turnings	48.00 to 49.00
No. 1 RR hvy. melting	69.00 to 70.00
Rails 2 ft. and under	86.00 to 87.00
Scrap rails, random lgth.	82.00 to 83.00
RR specialties	73.00 to 74.00
No. 1 machinery cast	66.00 to 67.00
Cupola cast	59.00 to 60.00
Heavy breakable cast	30.00 to 31.00
Stainless	
18-8 bundles and solids	520.00 to 530.00
18-8 turnings	420.00 to 430.00

Chicago

No. 1 hvy. melting	$ 46.00 to $ 47.00
No. 2 hvy. melting	42.00 to 43.00
No. 1 dealer bundles	58.00 to 59.00
No. 1 factory bundles (auto)	60.00 to 61.00
No. 2 dealer bundles	38.00 to 39.00
Unburned bundles	42.00 to 43.00
No. 1 busheling	57.00 to 58.00
Shredder scrap	57.00 to 58.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	33.00 to 34.00
Low phos. forge crop	79.00 to 80.00
Low phos. punchings plate ¼ in. and heavier	83.00 to 84.00
Low phos. 2 ft. and under	78.00 to 79.00
No. 1 RR hvy. melting	50.00 to 51.00
Scrap rails, random lgth.	54.00 to 55.00
Reroller rails	85.00 to 86.00
Rails, 2 ft. and under	79.00 to 80.00
RR couplers and knuckles	72.00 to 73.00
RR car axles	102.00 to 103.00
No. 1 machinery cast	103.00 to 104.00
Cupola cast	89.00 to 90.00
Stove plate	76.00 to 77.00
Steel car wheels	63.00 to 64.00
Stainless	
18-8 bundles and solids	470.00 to 480.00
18-8 turnings	370.00 to 380.00
430 bundles and solids	110.00 to 120.00
430 turnings	70.00 to 75.00

Philadelphia

No. 1 hvy. melting	$ 57.00 to $ 60.00
No. 2 hvy. melting	50.00 to 53.00
No. 1 dealer bundles	66.00 to 71.00
No. 2 dealer bundles	38.00 to 41.00
No. 1 busheling	68.00 to 71.00
Shredder scrap	71.00 to 74.00
Machine shop turn.	18.00 to 21.00
Mixed bor. and turn.	18.00 to 21.00
Shoveling turnings	30.00 to 33.00
Clean cast chemical borings	40.00 to 43.00
Low phos. 5 ft. and under	62.00 to 65.00
Low phos. 2 ft. punchings	89.00 to 92.00
Electric furnace bundles	75.00 to 78.00
RR specialties	74.00 to 77.00
Rails, 2 ft. and under	89.00 to 92.00
Cupola cast	53.00 to 56.00
Heavy breakable cast	55.00 to 58.00
No. 1 machinery cast	97.00 to 100.00

Detroit

Broker buying prices per gross ton on cars:

No. 1 hvy. melting	$ 40.00 to $ 41.00
No. 2 hvy. melting	38.00 to 39.00
No. 1 dealer bundles	47.00 to 48.00
No. 2 bundles	22.00 to 23.00
No. 1 busheling	46.00 to 47.00
Drop forge flashings	26.00 to 27.00
Machine shop turn.	21.00 to 22.00
Mixed borings and turn.	13.00 to 14.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	17.00 to 18.00
Heavy breakable cast	29.00 to 30.00
Mixed cupola cast	45.00 to 46.00
Automobile cast	63.00 to 64.00
Stainless	
18-8 bundles and solids	415.00 to 425.00
18-8 turnings	305.00 to 315.00
430 bundles and solids	85.00 to 95.00

Youngstown

No. 1 hvy. melting	$ 52.00 to $ 53.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 dealer bundles	54.00 to 55.00
No. 2 dealer bundles	33.00 to 34.00
Machine shop turn.	4.00 to 5.00
Shoveling turnings	15.00 to 16.00
Low phos. plate	58.00 to 59.00
Electric furnace bundles	58.00 to 59.00
Galvanized bundles	49.00 to 50.00

Cleveland

No. 1 hvy. melting	$ 47.00 to $ 48.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 dealer bundles	56.00 to 57.00
No. 1 factory bundles	56.00 to 57.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	58.00 to 59.00
Machine shop turn.	3.00 to 4.00
Mixed bor. and turn.	3.00 to 4.00
Shoveling turnings	6.00 to 7.00
Cast iron borings	6.00 to 7.00
Cut structural & plates, 2 ft. and under	78.00 to 79.00
Low phos. punchings plate	78.00 to 79.00
Drop forge flashings	33.00 to 34.00
Foundry steel, 2 ft. & under	62.00 to 63.00
No. 1 RR hvy melting	73.00 to 74.00
Rails, 2 ft. and under	87.00 to 88.00
Rails, 18 in. and under	88.00 to 89.00
Steel axle turnings	76.00 to 77.00
Railroad cast	94.00 to 95.00
No. 1 machinery cast	99.00 to 100.00
Cupola cast	94.00 to 95.00
Stove plate	69.00 to 70.00
Stainless	
18-8 bundles	400.00 to 410.00
18-8 turnings	305.00 to 315.00
430 bundles	90.00 to 100.00

Buffalo

No. 1 hvy. melting	$ 27.00 to $ 28.00
No. 2 hvy. melting	17.00 to 18.00
No. 1 busheling	34.00 to 35.00
No. 1 dealer bundles	32.00 to 33.00
No. 2 bundles	14.00 to 15.00
Machine shop turn.	1.00 to 2.00
Mixed bor. and turn.	10.00 to 11.00
Shoveling turnings	12.00 to 13.00
Cast iron borings	10.00 to 11.00
Low phos. plate	54.00 to 55.00
Structural and plate, 2 ft. and under	52.00 to 53.00
Rails, 2 ft. and under	44.00 to 45.00
Scrap rails, random lgth.	24.00 to 25.00
No. 1 machinery cast	67.00 to 68.00
No. 1 cupola cast	46.00 to 47.00

St. Louis

No. 1 hvy. melting	$ 50.00 to $ 51.00
No. 2 hvy. melting	42.00 to 43.00
Foundry steel, 2 ft.	42.00 to 43.00
No. 1 dealer bundles	50.00 to 51.00
No. 2 bundles	39.00 to 40.00
Machine shop turn.	12.00 to 13.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	30.00 to 31.00
No. 1 RR hvy. melting	50.00 to 51.00
Rails, random length	52.00 to 53.00
Rails, 18 in. and under	67.00 to 68.00
RR specialties	80.00 to 81.00
Cupola cast	70.00 to 71.00
Heavy breakable cast	48.00 to 49.00
Stove plate	70.00 to 71.00
Cast iron car wheels	49.00 to 50.00
Rerolling rails	84.00 to 85.00
Unstripped motor blocks	55.00 to 56.00

Birmingham

No. 1 heavy melting	$ 56.00 to $ 57.00
No. 2 heavy melting	53.00 to 54.00
No. 1 dealer bundles	56.00 to 57.00
No. 2 bundles	43.00 to 44.00
No. 1 busheling	56.00 to 57.00
Shredder scrap	73.00 to 74.00
Machine shop. turn.	20.00 to 21.00
Shoveling turnings	25.00 to 26.00
Cast iron borings	26.00 to 27.00
Electric furnace bundles	52.00 to 53.00
Elec. furnace, 3 ft. & under	53.00 to 54.00
Structural and plate, 2 ft.	73.00 to 74.00
Structural and plate, 4 ft.	67.00 to 68.00
No. 1 RR hvy. melting	54.00 to 55.00
Scrap rails, random lgth.	60.00 to 61.00
Rails, 18 in. and under	74.00 to 75.00
Angles and splice bars	65.00 to 66.00
No. 1 cupola cast	76.00 to 77.00
Unstripped motor blocks	55.00 to 56.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 32.00 to $ 33.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 dealer bundles	37.00 to 38.00
No. 2 bundles	23.00 to 24.00
Machine shop turn.	4.00 to 5.00
Shoveling turnings	7.00 to 8.00
Cast iron borings	8.00 to 9.00
Low phos. 18 in. and under	58.00 to 59.00
Rails, random length	38.00 to 39.00
Rails, 2 ft. and under	66.00 to 67.00
No. 1 cupola cast	48.00 to 49.00
Heavy breakable cast	22.00 to 23.00
Drop broken cast	64.00 to 65.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 30.00 to $ 32.00
No. 2 hvy. melting	26.00 to 28.00
No. 2 dealer bundles	25.00 to 26.00
Mixed bor. and turn.	7.00 to 8.00
Machine shop turn.	9.00 to 10.00
Shoveling turnings	14.00 to 16.00
Clean cast. chem. borings	34.00 to 35.00
No. 1 machinery cast	94.00 to 95.00
Mixed yard cast	41.00 to 42.00
Heavy breakable cast	17.00 to 18.00
Stainless	
18-8 prepared solids	460.00 to 480.00
18-8 turnings	375.00 to 400.00
430 prepared solids	90.00 to 100.00
410 solids	80.00 to 90.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 33.00 to $ 35.00
No. 2 hvy. melting	23.00 to 25.00
No. 1 dealer bundles	35.00 to 37.00
No. 2 bundles	20.00 to 22.00
No. 1 busheling	35.00 to 37.00
Shredder scrap	45.00 to 47.00
Machine shop turn.	1.00 to 2.00
Shoveling turnings	3.00 to 5.00
No. 1 machinery cast	100.00 to 105.00
Mixed cupola cast	28.00 to 30.00
Heavy breakable cast	4.00 to 6.00

San Francisco

No. 1 hvy. melting	$ 41.00 to $ 43.00
No. 2 hvy. melting	33.00 to 35.00
No. 1 dealer bundles	28.00 to 30.00
No. 2 dealer bundles	13.00 to 15.00
Machine shop turn.	5.00 to 7.00
Cast iron borings	5.00 to 7.00
No. 1 cupola cast	85.00 to 87.00

Los Angeles

No. 1 hvy. melting	$ 40.00 to $ 42.00
No. 2 hvy. melting	29.00 to 31.00
No. 1 dealer bundles	27.00 to 29.00
No. 2 dealer bundles	10.00 to 12.00
Machine shop turn.	5.00 to 7.00
Shoveling turnings	9.00 to 11.00
Cast iron borings	5.00 to 7.00
Elec. furnace, 1 ft. and under (foundry)	87.00 to 89.00
No. 1 cupola cast	89.00 to 91.00

Seattle

No. 1 hvy. melting	$ 56.00 to $ 58.00
No. 2 hvy. melting	45.00 to 47.00
No. 2 bundles	35.00 to 37.00
No. 1 cupola cast	91.00 to 93.00
Mixed yard cast	81.00 to 83.00

Hamilton, Ont.

Brokers buying price per net ton on cars:

No. 1 heavy melting	$ 53.00
No. 2 heavy melting cut 2 ft. and under	50.00
No. 1 dealer bundles	60.00
No. 2 bundles	18.00
Mixed steel scrap	32.00
Bush. new fact. prep'd.	58.00
Bush. new fact. unprp'd.	50.00
Machine shop turn.	28.00
Short steel turn.	31.00
Mixed bor. and turn.	20.00
Cast scrap	45.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$ 55.00 to $ 56.00
No. 2 hvy. melting	43.00 to 44.00
No. 2 bundles	28.00 to 30.00
Machine shop turn.	8.00 to 9.00
Crushed turnings	22.00 to 24.00
Shredder scrap	55.00 to 56.00
Cut structural plate 2 ft. and under	77.00 to 78.00
Unstripped motor blocks	55.00 to 57.00
Cupola cast	64.00 to 66.00

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STEEL PRICES

Codes identify Producers listed in the Key on page 65. (Prices quoted are mill base prices in cents per pound unless otherwise noted and do not reflect extras or surcharges.) N.A. = Not available.

Billets, Blooms, Slabs

(Dollars per net ton)

Carbon Rerolling, Midwest	
W5	$366.00
N4	$366.00
West	
C6	$346.00
Carbon Forging, East	
B3(3), C10	$420.00
R3	$420.00
Midwest	
R3, U1, W5	$420.00
S1	$420.00
C10	$420.00
K2	$400.00
W5	$400.00
West	
B3(2)	$430.00
C6	$420.00
South	
A7	$420.00
Alloy, East	
R3, C10	$463.00
B3	$459.00
Midwest	
W8, W5	$459.00
S1, U1	$459.00
R3	$459.00
West	
B3	$469.00
C6	$469.00
South	
A7	$436.00

Piling Sheet Steel

(cents per lb)

Midwest	
U1	26.45

Structurals

Carbon, East	
B3(2)	23.90
U1, J3	23.90
Midwest	
A7, N4	24.15
C20	22.90
W8	22.90
I3, T10, U1	23.90
West	
C6	22.85
U1	24.40
B3(2)	21.65
South	
C16, U1	23.90
T10	22.90
A8	Cmp*
High-Strength, Low Alloy, East	
B3(2)	23.90
U1, J3	23.90
Midwest	
N4	24.15
W8	24.15
U1	23.90
I3	24.15
West	
U1, A7	24.40
B3(2)	21.65
South	
U1, C16	23.90
Wide Flange, Carbon, East	
B3	23.90
U1, A7, J3	23.90
Midwest	
U1	23.90
N4	24.15
I3	24.15
West	
U1	24.40
C6	21.90
South	
A7	24.15

Strip

Hot-Rolled, Carbon, Cut ll Edge—all widths, East	
B3, U1	20.80
J3	20.80
Midwest	
A7	20.80
D1	20.80
S1, J3, D1	20.80
W3	20.80
N4	17.50
W5	20.80
U1	20.80
B3, G2, I3, I4, M2, R3, J3, G3	20.80
West	
K1	20.80
B3	24.70
South	
R3	20.80
Cold-Rolled, Carbon Max. 25%, East	
E4	29.75
R7, S10, B4	29.60
P15	24.80
S7	Cmp*
U1	33.25
D1(1)	Cmp*
Midwest	
G4	24.80
I4	26.15
W14	22.95
S1, U1, J4	33.25
T4	Cmp*

*Composite pricing

West	
U1	33.25
High-Strength, Hot-Rolled, Low Alloy, Cut Edge & Mill Edge—all widths, East (plus extras)*	
Midwest	
M2, G3, R3, W3, I4, J3, G2	20.80
A7	20.80
S1	20.80
I3	20.80
West	
K1	20.80
South	
R3	20.80
High-Strength, Cold-Rolled, Low Alloy, Mill Edge, East	
R7	29.00
Midwest	
S1	32.00
Alloy, Hot-Rolled, Midwest (plus extras)*	
S1	23.20
G4	25.80
I4	23.95
Alloy, Cold-Rolled, East	
C11, E4, M8	43.35
R7	32.75
B4	42.60
P15	32.10
S1	39.90
Midwest	
I4	41.75
S1	37.65

Sheets

Hot-Rolled, Carbon (18 Ga & Hvyr), East	
B3	20.80
J3	20.80
U1	20.80
Midwest	
A7, U1, B3, G2, G3, I3, M2, R3, W3	20.80
S1, W5, D1	20.80
J3	20.80
I4	19.50
West	
U1	21.30
K1	20.80
South	
R3	20.80
Cold-Rolled, East, Class I	
B3(2), U1	24.65
J3	24.65
Midwest	
B3, I3, G3, R3, M2, U1(2)	24.65
G2, W3, M11	24.65
I4	22.00
J3, A7	24.65
S1, W5, D1	24.65
West	
U1	25.15
South	
R3	24.65
Galvanized (hot-dipped), East	
B3(2)	26.25
Midwest	
J3, D1	26.25
I3, W5, S1	27.15
U1, A7, R3, Y1	26.25
G2, W3, M11	26.25
West	
K1	27.15
South	
U1	26.25
R3	26.25
Enameling, Midwest	
A7, I3, U1, J3	26.15
S1	26.50
Long-Terne, Midwest	
W5	28.30
A7, U1	27.60
R3	27.60

Wire Rod

East	
B3(2)	22.35
U1	22.35
Midwest	
N4	22.35
U1, K2	22.35
West	
A7	22.00
C6	21.45
B3	23.25
U1	22.35
South	
G7	22.35

Tinplate

Electrolytic Tinplate

	per base box
Single Reduced (70 lb)	
East	
B3, J3	$26.29
U1	26.29
Midwest	
B3	$26.29
U1	26.29
J3 (75 lb)	26.29
M11	26.29
W3	26.29
W5	26.29
West	
K1	$25.44
U1	26.79
South	
U1	$26.29
Double Reduced (55 lb)	
Midwest	
M11 (50 lb)	$21.49
B3, J3	21.49
U1	21.49
W3	21.49
W5	21.49
West	
K1	$20.39
U1	21.99
South	
U1	$21.49

Black Plate

Single Reduced (75 lb)	
East	
B3	$23.36
Midwest	
J3	$23.36
M11	23.36
I3, U1, W5	23.36
W3	23.36
West	
K1	$24.01
U1	23.36
Double Reduced (55 lb)	
East	
B3	$18.93
Midwest	
M11	$18.93
W5, U1	18.93
J3	18.93
W3	18.93
W5	18.93
West	
U1	$18.93
South	
U1	$18.93

**70 lb—base weight extra 45¢
***50 lb—base weight extra $1.40

Bars

Carbon Steel, Hot-Rolled
(Special quality)

East	
R3, K3	23.95
R5	23.95
B3(3), J3	23.95
U1, C10	23.95
Midwest	
A7, C20	23.95
N4	23.95
U1, I3, I4	23.95
R3, T10	24.075
K2	23.95
West	
B3	23.95
C6	24.45
U1	23.95
B3	24.70
South	
A8	20.65
A7	23.95
C16	23.95
Cold-Finished Carbon, East	
A11	22.15
J3(2)	31.50
R3	31.50
C21	21.15
J3, L2	31.00
C2	23.025
M8, W10, T11, S8	31.00
N1	24.475
R4	22.25
B4	29.50
M1	23.025
B4, C10	31.00
J3	31.50
Midwest	
B5, W10, Y1, W8, R3	31.00
J3	32.15
B1	19.80
L2	30.75
N9	31.00
P3	19.85
W14	22.20
J3(3)	31.00
B5	31.25
J3	32.15
West	
B5	31.20
B5	34.90
R3	31.20-34.90
South	
B5	32.85
J3	31.95
C16	24.40
J3	31.95
Alloy, Hot-Rolled, East	
B3(2), R5, K3, C10	26.10
R3	26.10
J3	26.10
Midwest	
A7, U1	26.10
I3, C10	26.10
R3	26.10
I4	24.85
West	
B3, U1	26.10
B5	18.50
C6	26.60
B3	27.10
South	
A7	24.85
A8	22.00
Alloy, Cold Drawn, East	
L2	35.20
R3, N1, C2	35.40
M1	28.025
R4	25.65
A11	30.50
J3, W10, L2	34.85
T11, S8	34.85
C10	34.85
J3(2)	35.40
Midwest	
B5, R3, C10	34.85
C2	28.275
J3, M9, W10	35.40
P3	22.75
B1	22.70
N9	34.85
L2	34.65
B5	35.10
J3	36.00
J3	34.85
West	
R3	35.20-38.25
B5	35.20
B5	38.25
South	
J3	35.40
C16	28.00
B5	36.75

Plates

Carbon Steel, East	
B3(2)	25.25
L4	24.25
P2	24.25
U1	24.25
J3	25.25
Midwest	
B3, G3, R3, G2, S1	25.25
I3, I4, W5	25.25
J3, A7	21.70
U1	24.25
West	
A7, B3, C6, O2	25.25
K1	23.50
U1	24.25
South	
R3	25.25
A7	25.25
U1	24.25
Alloy, East	
B3, J3	33.05
U1, L4	33.05
P2	32.05
Midwest	
B3	33.05
G2, G3	31.05
I4, U1	33.05
West	
B3	33.05
O2	30.55
K1	31.30
South	
A7	27.55

Wire

Carbon Steel Wire, East	
B3(2)	27.10
U1	27.70
A11	22.15
Midwest	
A7, R3	24.60
N4, W7	27.40
K2	24.20
South	
U1	27.70
A8	22.85
West	
A7	25.95
C8	24.95

STEEL PRICES

Producer Key
With Principal Offices

A4 American Cladmetals Co., Carnegie, Pa.
A7 Armco Inc., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A11 Atlantic Wire Co., Branford, Conn.

B1 Baron Drawn Steel Corp., Toledo, Ohio
B3 Bethlehem Steel Corp., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin Steel Co., Harvey, Ill.

C1 Calstrip Corp., Los Angeles
C6 CF&I Steel Corp., Pueblo, Colo.
C10 Copperweld Steel Co., Warren, Ohio
C11 Crucible Divisions, Colt Industries, Pittsburgh, Pa.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Co., Birmingham, Ala.
C20 Calumet Steel Div., Chicago Heights, Ill.
C21 Cumberland Steel Co., Cumberland, Md.

D1 Detroit Strip Div., Cyclops Corp.
D2 Driver Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.

E3 Enamel Products & Plating Co., McKeesport, Pa.
E4 Elliot Bros. Steel Co., New Castle, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Division, National Steel Corp., Ecorse, Mich.
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owensboro, Ky.
G6 Gibraltar Steel Corp., Buffalo, N. Y.
G7 Georgetown Steel Corp., Georgetown, S. C.
G8 Guterl Special Steel Corp.

H1 Hercules Drawn Steel Corp., Livonia, Mich.

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Steel Corp., Chicago

J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif
K2 Keystone Consolidated Industries, Inc.
K3 Kentucky Electric Steel Co., Ashland, Kentucky
K5 Kemco Div., Foote Mineral Co., Keokuk, Iowa

L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.
L5 Litho-Strip Corp., Chicago

M2 McLouth Steel Corp., Detroit
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M8 Mill Strip Products Div., National Steel Service Center, National Steel Corp.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M11 Midwest Steel Div., National Steel Corp., Portage, Ind.

N1 Northeast Precision Steel Co., Boston, Mass.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle, Wash.
N9 Nelsen Steel & Wire Co., Chicago, Ill.
N10 North Star Steel Co., Saint Paul, Minnesota

O2 Oregon Steel Mills, Portland, Ore.

P2 Phoenix Steel Corp., Claymont, Del.
P3 Wyckoff Steel Div., Plymouth, Mich.
P9 Pacific States Steel Co., Niles, Cal
P13 Penn Dixie Steel Corp., Kokomo, Ind.
P14 Pacific Tube Co., Los Angeles
P15 Philadelphia Steel and Wire Corp., Phila.

R3 Republic Steel Corp., Cleveland
R4 Ramco Steel Co., Buffalo, N. Y.
R5 Roblin Steel Corp., Inc., North Tonawanda, N. Y.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S10 Seneca Steel Service, Buffalo, N. Y.
S16 Southern Precision Steel Co., Gulfport, Miss.

T4 Thomas Steel Strip Co., Warren, O.
T5 Timken Company, Steel Division, Canton, O.
T7 Texas Steel Co., Fort Worth, Tex.
T9 Triumph Electro Corp., Chicago, Ill.
T10 Tennessee Forging Steel Corp., Harriman, Tenn.
T11 Teledyne Columbia-Summerill, Carnegie, Pa.

U1 United States Steel Corp., Pittsburgh, Pa.

W3 Weirton Steel Division, National Steel Corp., Weirton, West Va.
W5 Wheeling-Pittsburgh Steel Corp.
W7 Wilson Steel & Wire Co., Chicago
W10 Wyckoff Steel Div., Ampco-Pittsburgh Corp., Pittsburgh, Pa.
W14 Whittaker Steel Strip Div., Detroit, Mich.

Steel Service Center Prices

Price, Dollars per 100 lb

Cities*	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
City Delivery Charge*	Hot-Rolled (10 gage)	Cold-Rolled (20 gage)	Galvanized (16 gage)	Hot-Rolled Strip	Plates	Standard Structurals	Hot-Rolled (merchant)	Cold Finished	Hot-Rolled 8620 As Rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 8620 As Rolled	Cold-Drawn 4140 Annealed
Atlanta	25.04	29.02	33.66	34.17	29.52	31.46	21.27	42.11	43.20	54.80	71.74	74.69
Baltimore	32.25	36.51	42.48	42.85	35.56	37.48	23.10	48.63	56.80	61.08	71.68	77.88
Birmingham	25.90	30.24	36.47	35.03	29.67	31.68	22.25	43.40	50.53	51.39	69.70	76.27
Boston	27.30	32.77	37.86	44.27	37.43	37.68	21.80	47.75	57.60	60.66	68.49	75.74
Buffalo	27.75	34.41	36.35	43.01	35.20	32.46	18.26	45.85	54.11	55.64	62.09	70.72
Chicago	26.20	30.50	30.15	31.83	29.41	29.80	16.89	42.43	38.12	47.10	57.97	59.33
Cincinnati	24.09	29.01	31.66	31.75	30.96	31.87	17.02	43.18	41.70	48.16	53.82	60.37
Cleveland	26.88	31.70	34.40	33.08	30.09	32.50	18.11	42.28	40.45	50.48	56.63	62.50
Denver	32.69	38.65	38.66	42.32	36.91	38.18	22.79	49.35	56.13	65.40	72.50	81.22
Detroit	26.57	31.41	33.26	32.65	29.45	31.24	17.20	42.95	39.88	47.93	53.72	60.20
Houston	28.50	32.64	36.06	41.35	34.12	37.90	47.18	42.45	56.79	64.97	73.05	81.09
Kansas City	27.04	29.22	34.19	32.39	32.19	33.18	20.29	44.35	50.64	58.69	64.36	73.32
Los Angeles	34.08	36.78	39.14	47.53	38.37	40.45	32.55	50.66	62.71	72.33	78.31	87.97
Memphis	30.25	29.07	33.57	36.74	30.58	31.81	23.10	36.09	52.82	56.96	67.85	77.44
Milwaukee	23.92	28.76	31.69	33.02	30.75	31.71	16.91	42.26	39.80	48.13	55.04	60.53
New York	23.42	27.61	30.77	42.40	31.67	32.93	20.83	48.87	50.98	59.83	68.45	75.35
Philadelphia	28.57	34.80	37.22	44.85	33.40	37.64	22.78	48.62	52.89	60.22	69.85	76.05
Pittsburgh	27.48	32.61	38.15	40.12	35.59	36.44	21.35	45.69	48.95	59.88	66.19	72.84
Portland	32.04	37.16	41.51	33.10	34.82	35.20	53.64	56.85	61.00	64.10	66.10	....
San Francisco	31.07	36.66	39.71	46.66	39.32	40.88	30.78	51.14	63.99	72.88	79.58	88.10
Seattle	29.85	35.14	37.68	46.76	32.89	35.32	29.86	51.38	64.02	70.14	73.83	87.67
Spokane	21.08	30.56	33.56	36.69	35.18	25.16	20.32	41.00	42.02	46.30	....	58.32
St. Louis	27.22	32.50	34.47	36.45	30.11	32.47	18.54	43.64	44.47	52.13	59.81	65.93
St. Paul	27.30	31.29	33.61	35.20	29.31	32.38	17.22	43.95	40.17	49.68	52.53	61.93

Base Quantities. All HR products may be combined for quantity. Hot-rolled sheet, 10 ga x 36 x 96—120; Cold-rolled sheet, 20 ga x 36 x 120; Galv. sheet—16 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate ¼" x 84/; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds ¾-2 15/16; Cold finished bar—C 1018—1" rounds; Alloy bar—Hot-rolled 8620—1¾" round; Cold drawn—1" round; Hot-rolled 4140—1⅞" round; Cold drawn—1" round. Check local supplier for additions or deductions from base.

*Prices at all points include metropolitan delivery charges.

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